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Original Communications.

*THE SUPRARENAL GLAND AND ITS PREPARATIONS IN OPHTHALMIC PRACTICE.**

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For the introduction into ophthalmic practice of certain preparations of the suprarenal gland we are indebted to the observations of Louis Dor,[1] Darier,[2] and Armand Barraud[3] abroad, and especially in this country to those of W. H. Bates,[4] who made a preliminary report on the use of extract of suprarenal capsule in the eye to the Section in Ophthalmology of the New York Academy of Medicine, April 20, 1896, his experiments with this substance having been begun two years prior to this date. Since this time the accumulated experience of many observers has demonstrated that the suprarenal gland itself and certain preparations of it and principles isolated from it are capable of producing a constricting influence on the superficial vessels of the eye unequaled by any other substance with which we are acquainted.

[1] *Province Médicale*, July 11, 1895.
[2] *Berichte über die 25 Versammlung. der Ophthal. Gesellschaft*, Heidelberg, 1896.

*A paper read before the Section of Medicine, College of Physicians of Philadelphia, April 14, 1902.

[3] Quoted by H. Landolt; *Centralbl. f. prakt. Augenheilk.*, xxiii, 1899, p. 322.
[4] *New York Medical Journal*, vol. 63, 1896, p. 647.

The preparations commonly employed in ophthalmic practice are the following: An aqueous extract of the dried gland; suprarenin, a principle isolated by Otto von Fürth, identical with epinephrin, separated by Prof. J. J. Abel; atrabilin, introduced by Dr. Wolffberg and a chemist named Max Leschnitzer; and especially adrenalin, described by its discoverer, Dr. Jokichi Takamine, as the blood-raising principle of the gland. The French preparation of Leon Jaquet, which is similar to atrabilin, and Merck's extraction suprarénale hæmostaticum, have also been utilized. Of the dried extract, for example, the one supplied by Armour & Co., 5 to 10 grains to the drachm of sterilized water, may be employed, and to each drachm of the water one minim of carbolic acid may be added, as suggested by Joseph Mullen.[1] In place of water, a saturated solution of boric acid is utilized by some surgeons—for example, W. H. Bates. This solution should be filtered before using it. The extract may also be placed in a glycerin and water mixture, and can be obtained in soluble compressed tablets, which may be dissolved in distilled water. Inasmuch as any solution of the gland extract will soon become foul, it should be freshly prepared as required, by mixing the substances with sterilized water, because even the excellent methods of preserving aqueous solutions of the extract devised by Dr. A. E. Hubbard, of Buffalo, and described by Lucien Howe,[2] according to Arlt, are not entirely satisfactory. Howe's experiments indicate that solutions of the extract will keep if they contain 1:10,000 of formalin, but they are irritating, and the same is true of the concentrated extract in 25 per cent of glycerin, diluted as required. Moreover, the glycerin solution decomposes, although more slowly than an aqueous one.

An average strength of atrabilin, according to Wolffberg,[3] is 25 per cent; 10-per-cent solutions, although active if there is only slight congestion of the ocular coats, are inefficient under other circumstances. He also employs 50-per-cent solutions, and even the undiluted liquid. It may be mixed with boric acid, as follows: Atrabilin 2.0, acid boric 0.5, distilled water 10.0, and used as a collyrium. Suprarenin has been employed in two- to ten-per-cent solutions, and in ¼-per-cent solutions in physiological salt solution in subconjunctival injections in animals by Wessely.[1]

Adrenalin, which is said to be one thousand times stronger than the fresh gland, is quite active in a dilution of 1:10,000. The sterilized solution of adrenalin chloride, 1:1000, as prepared by Parke, Davis & Co., may be diluted, as required, with sterilized water, physiological salt solution, or boric acid solution. If properly protected, the stock solution is said to keep for months. But Arlt[2] has observed that adrenalin will deteriorate, even if the bottle is not opened, and that after a time the solution will show a fungus growth.

(a) Local Action on the Normal Eye.—From thirty to sixty seconds after the instillation into the conjunctival cul-de-sac of a few drops of one of the adrenal preparations already described, the mucous membrane becomes extremely pale, due to an ischemia of its blood-vessels. This action is a peripheral one, and results from a marked stimulation of the vasoconstrictors. The smaller conjunctival vessels are first affected, the larger ones less markedly so, while the perforating branches of the episcleral vessels are at first very little influenced. Indeed, in one sense they become rather conspicuous on account of the extreme pallor of the surrounding tissue. By repeating the instillation, or by increasing the strength of the preparation employed, the general anemia increases until eventually an almost deathlike pallor can be produced. The effect, again varying with the strength of the solution and the number of instillations, lasts from half an hour to two hours; the influence of adrenalin has been noted by some observers to remain as long as four hours (Starkey). Gradually the pallor subsides and the condition of the mucous membrane prior to the application of the drug returns. These preparations have no effect upon the vessels of the inner coats of the eye—that is, the retinal and choroidal vessels—and none upon the pupil and accommodation, and exercise no dele-

[1] *Journal of the American Medical Association*, May 20, 1899.
[2] *American Journal of Ophthalmology*, vol. xvii, 1900, p. 204.
[3] *Woch. f. Therapie und Hygiene des Auges*, vol. ii, 1898-1899, p. 312.

[1] *Berichte über die 28 Versammlung. der Ophthal. Gesellschaft*, Heidelberg, 1900, p. 69.
[2] *American Journal of Ophthalmology*, November, 1901, p. 326.

terious influence on the epithelium of the cornea. Wolffberg, however, states that atrabilin may possibly induce a slight contraction of the pupil, while suprarenin, according to Wessely and H. Landolt, may produce mydriasis, both when it is used in the form of an instillation and when it is injected subconjunctivally. According to Wolffberg's summary, atrabilin, and doubtless the other preparations also, causes some widening of the palpebral fissure, although there is no lack of power to close the lids. Several authors have noted diminished intra-ocular tension as an effect of the suprarenal preparations, although there is some difference of opinion on this point. Suprarenin is slightly irritating; the other preparations produce no local discomfort, but, on the contrary, a cooling and grateful sensation, but they are not anesthetic.

(b) Local Action on the Inflamed Eye.—From forty to sixty seconds after the application of the suprarenal preparations to an inflamed eye, depending somewhat upon the character of the inflammation and the depth of the congestion, a marked anemia is produced. If the ocular condition represents a simple hyperemia or overdistention of the conjunctival vessels in a conjunctivitis, the blanching is just as pronounced as in the normal eye. If the iris and ciliary body are inflamed and the so-called ciliary congestion is prominent, there is much difference of opinion as to whether this can be dissipated in like manner. Grosz, for example, maintains that atrabilin removes superficial and diminishes deep vascularization, and this would seem to me to be a conservative and correct statement. Indeed, it has been asserted that the suprarenal gland preparations may be used as differential diagnostic agents in cases of general inflammation of the eyeball in order to ascertain whether the iris and ciliary body are participating in the inflammation; that is to say, the general anemia of the superficial vessels which they produce will uncover and reveal the congestion of the ciliary zone which may have been masked by the previous universal congestion. Wolffberg, however, maintains that this is not a safe test, and that the failure of a zone of ciliary congestion to appear after the superficial hyperemia has been dissipated does not necessarily mean that the iris and ciliary body are free from inflammation. In other words, he thinks the suprarenal preparation, in his experiments atrabilin, may cause the injection of both superficial and deep vessels to disappear. According to Koenigstein, Wolffberg, and a number of others abroad, as well as observers in our own country—for example, Bates, Reynolds, Bulson, J. J. Kyle, and others—corneal vascularization as it occurs in trachoma and certain forms of keratitis is very much modified by local applications of suprarenal preparations. Indeed, Koenigstein says that the vessels in the cornea in vascular keratitis can be made to disappear. In addition to removing the congestion and to a certain extent the irritation of inflamed eyes, they distinctly lessen lacrimation. A very interesting effect of these preparations, and indeed a very important one, noted by almost all observers, is their power to assist in the absorption of other drugs, notably cocaine, eserine, atropine, etc., which are thus enabled to exert their physiological action with greater effect than they can when applied to a congested eyeball.

Visual acuity may be improved by instillation of the suprarenal gland preparations, because the excess of blood on the surface of the eye has been lessened. According to Bates[1] this power is not limited to inflamed eyes, and he has noted that one drop of the aqueous extract instilled into most eyes will temporarily improve the vision. A number of observers—for example, Darier, Bates, Dudley Reynolds, and others—are persuaded that in glaucoma, at least, a decrease in intra-ocular tension may follow the local use of the adrenal preparations. As in the normal eye, they do not influence the deeper circulation—that is to say, the circulation of the ciliary body, retina, and choroid. By their continued use a follicular catarrh resembling atropine conjunctivitis may arise, according to the reports of some observers. I have never observed this effect. They have no true anesthetic influence.

(c) Action on the Eye of Intravenous and Subconjunctival Injections.—The most important researches on the effect of adrenal preparations on the eye when injected into the venous circulation have been made by Lewandowsky. According to Wessely, this observer under these circumstances noted contraction of all of the muscles supplied by the sympathetic, resulting in mydriasis, protrusion of the eyeball, retraction of the third

[1]Personal communication.

eyeball, and widening of the palpebral fissure, these effects lasting as long as the influence on the vessels. Wessely experimented with subconjunctival injections of suprarenin, injecting one milligramme, and produced mydriasis which was not due to the subconjunctival injection itself but to the drug, because the same effect was brought about by repeated instillations of this preparation. The mydriasis begins near the point of injection, and reaches its maximum in ten to fifteen minutes. A similar injection of suprarenin prevents the formation of Ehrlich's line and the green discoloration of the anterior chamber which takes place when fluorescin is injected into the ear vein, which indicates that the drug contracts the vessels of the iris and ciliary body.

In other experiments an artificially induced hyperemia of the ciliary body was prevented from reaching its full development by suprarenin; tension was restored much more slowly after puncture of the anterior chamber in an eye under the influence of the drug, and the tension of an uninjured normal eye was reduced.

Discussing its mode of action, Wessely excludes an influence on the endings of the sympathetic, on the strength of an experiment in which extirpation of the cervical ganglion of the sympathetic did not interfere with the action of this substance on the eye. The mydriasis was shown not to be due to contraction of the vessels of the iris, nor to paralysis of the sphincter muscle, nor to paralysis of the endings of the oculomotor in the sphincter, and he believes that the suprarenin acts directly on the muscle cells of the dilator, or on ganglion cells belonging to the muscle, such as probably exist in the ciliary body.

H. Landolt[1] has also experimented with subconjunctival injections of suprarenin and produced maximum dilatation of the pupil beginning at the point of injection. He did not observe change in the vessels of the fundus or alteration in the ocular tension, and has noted necrosis developing at the point of injection.

(d) Therapeutic Indications.—There is much difference of opinion in regard to the therapeutic value of the preparations of the suprarenal gland, some observers maintaining that their curative value is *nil,* while others assert that their effect is not only vasoconstricting, but that they have a distinctly healing influence. Without attempting in the brief time at my disposal to summarize the opinions of the various authors, I may say that those with the largest experience have proclaimed their value as therapeutic agents. The following would seem to be a conservative estimate made from the literature of this subject. These preparations are valuable:

1. To relieve hyperemia of the conjunctiva when this is caused, for example, by local irritation, nasal catarrh, hay-fever, eye-strain, etc. Under these circumstances adrenalin is particularly valuable and may be employed in very dilute solutions in the form of collyrium associated with boric acid. For example, 1 drachm of the 1:1000 solution, in 2 ounces of distilled water, with 10 grains of boracic acid, frequently employed, is effectual.

2. To relieve the congestion, irritation, and lacrimation caused by ordinary conjunctivitis, and to combat blepharospasm (Radziejewski).

3. To relieve Fruehjahr's catarrh, on which, if the instillations are repeated, according to Perret, these substances have a marked curative influence, the excessive secretion diminishing, the palpebral fissures widening, and the discomfort lessening. The granulations, however, are not influenced.

4. To relieve trachomatous pannus and various types of vascular keratitis and scleritis (von Reuss), repeated instillations under these circumstances reducing the vascularization and allowing the tissues a chance to recover.

5. To enhance the action of cocaine, atropine, eserine, and pilocarpine by promoting their absorption. The adrenalin preparations are first used, and followed during the period of blanching by the drugs named in any of the conditions in which they are required.

6. To reduce, possibly, the tension in glaucoma, as has been pointed out by Bates, Darier, Reynolds, and other observers.

7. To facilitate the introduction of lacrimal sounds, the preparations being first injected through the canaliculus into the *ductus ad nasum,* their effect being to lessen the congestion and consequently promote the ease with which the sound is passed.

8. To relieve ciliary pain, as has been

[1] *Loc. cit.*

pointed out by Dudley Reynolds, for example, in all forms of keratitis, iritis, and cyclitis with glaucoma.

9. To modify, according to the same observer, and even to clear up, certain opacities of the cornea—for example, those which follow contusions, and even the opacities in syphilitic iritis.

10. To produce a cosmetic effect.

It must again be reiterated that there is great difference of opinion as to the curative value of adrenal preparations. Many surgeons, like Adolph Alt, for example, who have largely used them, while perfectly agreeing in regard to their remarkable effect in producing anemia of mucous membranes, have failed to observe any therapeutic value. This has been my own experience; that is to say, the gland preparations or principles do not seem to be curative in the true sense of the word, although there can be no question that they favorably modify diseased processes under certain circumstances, and are of great value in aiding the action of other remedies, or, more accurately, in paving the way for their action. I have often been impressed with the fact that after their use atropine is more effectual in the treatment of iritis, and I have also seen the pannus of trachoma subside when they were used, but always in connection with other remedies. The same is true of episcleritis and conjunctivitis. The suprarenal gland preparations are not to be mixed, except as already described, with other drugs—in fact, they cannot be associated in the same solution with bichloride of mercury, nitrate of silver, and the like, and it is better not to mix them with cocaine, but to use the two separately, one following the other.

(e) Hemostatic Value.—There is also much difference of opinion as to the value of these preparations in checking hemorrhage, and if I may quote my own experience, I would say that while they certainly are of use in preventing the oozing from small vessels—for example, in a pterygium operation, in incising the conjunctiva preparatory to tenotomy, perhaps even in making an iridectomy—they are of little or no value when the bleeding takes place from larger or even medium-sized vessels. Some writers are disinclined to use them at all in operations on account of the difficulty of sterilization. Wolffberg, for example, who is enthusiastic in regard to the action of atrabilin, does not recommend it in operative work. The difficulty in regard to sterilization is somewhat removed by the employment of adrenalin. Whether boiling has a deleterious influence on their action does not seem definitely proven, some authors—for example, John J. Kyle—maintaining that frequent sterilization does not alter the physiological properties of suprarenal extract, others declaring that boiling, in the first place, fails to sterilize, and in the second place destroys its virtue. Whether these preparations produce a tendency to postoperative hemorrhage is also somewhat debatable. Personally, I have felt on several occasions that there was this tendency, although it was never marked. C. R. Holmes, however, distinctly asserts that suprarenal extract may cause postoperative hemorrhage, and H. Landolt has seen secondary hemorrhage after its use.

There is some difference of opinion also in regard to the value of the various preparations. The two most used in this country, adrenalin chloride and aqueous solutions of the dried extract, if I may quote my own observations, yield practically identical results. Solutions of adrenalin chloride have the advantage of being perfectly clear, are more readily kept, and are less subject, I think, to contamination. They have the disadvantage, however, of occasionally producing marked irritation, and I have seen a number of hyperemic conjunctivas grow markedly more hyperemic after the subsidence of the blanching than they were prior to its use, and the patient has complained, not only at the moment of the application, but some time afterward, of a stinging and burning sensation. It has been suggested to me by Professor Abel that this may have been due to the presence of free acid. It will be remembered that many of the German authors report a similar irritating action from suprarenin. It has also seemed to me that dilute solutions of adrenalin chloride, 1:10,000, or even weaker, are more efficient than the stronger solutions. A number of surgeons believe that freshly prepared solutions of the dried gland are more efficient than adrenalin. This, for example, is the statement of Gradle. Wolffberg has been unable to detect any difference in the efficiency of adrenalin and atrabilin.

*THE USE OF SUPRARENAL GLAND IN DISEASES OF THE NOSE AND THROAT.**

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Preparation of Solution.—W. H. Bates, of New York, in 1896, was the first to use and recommend the suprarenal gland in the treatment of diseases of the eye, nose, throat, and ear. Since that time journal literature, particularly in America and England, has been most prolific in clinical observations of this drug, and the history of the use of its various preparations in diseases of the nose and throat shows that while there are slight differences in some minor points, yet the general results have been practically the same. For several years considerable experimentation was done with the view of preserving the solution. The preparations which have been used most extensively in the throat and nose are, in the order of their appearance, as follows: Suprarenal extract; aqueous extract of suprarenal gland; suprarenal solution with chloretone; adrenalin; and adrenalin chloride. To Takamine we are indebted for adrenalin, and I believe that a solution of this alkaloid is the most satisfactory preparation in use at the present time. I think, however, we still have present some irritating material, the elimination of which will give us still greater satisfaction.

In my remarks on the subject of adrenalin in the diseases of the nose and throat I will confine myself entirely to its local use, as I have had very little experience with its internal administration.

Strength of Solution.—The strength of the solution to be used is a question on which opinions differ. In my experience it varies greatly with the individual as well as with the pathological conditions present. In this, however, the drug does not differ from other medicinal agents. I have used a semi-solid preparation of the suprarenal gland, without any dilution whatever, directly on the mucous membrane, with no bad results, while I have had most disastrous results from the application of a 1:10,000 solution of adrenalin chloride. In fact, I believe some of the results which have been accredited to the unstableness of solutions of the drug are due to this irregularity. Another explanation of this erratic action may be that, owing to the fact that it is an animal extract, the secretion from the nasal or pharyngeal mucous membrane, if for example extremely acid, may perhaps when in chemical combination with the solution form an irritating compound. I have noticed in a number of applications made at different times in the same individual, the same solution being used and applied in exactly the same manner, that the results following one application were most beneficial, while an application made the following day, or possibly two days later, produced the most intense coryza with frontal headache and trifacial neuralgia. Some patients seem to be particularly susceptible to the drug, and in them every application to any part of the upper respiratory tract is followed by intense discomfort, with all the symptoms of an acute cold, which lasts in some cases from three to four days. Few cases in which the drug is applied locally show any constitutional symptoms, probably about three or four in one hundred. I have only seen one case in which the heart's action was depressed, the main symptoms being severe headache, considerable nausea, and a slight amount of general depression.

Methods of Application.—I have found that the best way of applying it is in conjunction with a two-per-cent solution of cocaine. If used in the nose, a pledget of cotton saturated with a two-per cent solution of cocaine should be allowed to remain in contact with the tissues not longer than two minutes, and be immediately followed by a similar application of the adrenalin solution, the strength of the latter depending upon the degree of ischemia desired. If for operative procedures, 1:1000 or 1:2000 should be used; if for the relief of local congestion, 1:10,000 gives the most satisfactory results. The adrenalin pledget should be left in contact with the tissues for from ten to fifteen minutes, the time depending on the result desired, as well as on the amount of swelling to be reduced; if the congestion of an acute coryza is to be relieved ten minutes will suffice. After the removal of the adrenalin the tissues should be coated with an oily preparation, in order to diminish the irritation and lessen the danger of bad local after-

*Read by invitation before the Section on General Medicine of the College of Physicians, Philadelphia, April 14, 1902.

effects. In the throat it can be applied on a swab or in the form of a spray.

Local Effects.—When applied to the nasopharyngeal mucous membrane, especially that of the turbinals, the first symptom is the blanching of the surface, which is soon followed by slow contraction. This is natural, as absorption is first into the superficial capillaries, which soon contract and force the solution into the deeper and larger venous channels, which, on account of their size, contract more slowly. The effect is more marked in the nasal mucous membrane than in the pharyngeal or laryngeal, which is due, I think, to the fact that the submucosa is thinner in the nose, and the mucosa is supported almost entirely by bony framework. Congestion is more rapid in the nostril for that reason, and the physical law that to every action there is a reaction explains the rapid depletion of the nasal mucosa. This difference may also be due to the fact that in the nose there is erectile tissue. If the congestion of the part is purely a local one and not depending on any systemic condition, the results obtained from the application of the adrenalin chloride are, as a rule, most marked. If, however, the congestion is only a local manifestation of some systemic condition, in other words a cyanotic congestion, the application of the adrenalin chloride will not be beneficial.

In a number of cases I have noticed a rather peculiar effect of adrenalin chloride when applied to the nasal mucous membrane; it shrinks that tissue and relieves interference with nasal respiration, yet at the same time the patient complains of a feeling of intense congestion, exactly as if the nasal mucous membrane were engorged as in an acute coryza, the voice even having a nasal twang. This peculiar nasal twang exists although the posterior end of the turbinals have been included in the contraction. The feeling of intense congestion can be explained by the fact that the action of the adrenalin is to drive the blood from the surface arterioles, capillaries, and venules, and as the nasal mucous membrane receives its blood-supply largely through bony structures, the feeling of congestion would therefore be caused by the damming back of blood on the larger vessels, with the somewhat forced collateral circulation.

In many cases there is a secondary congestion after the effect of the adrenalin has passed off. While this does not occur in all cases, when it does occur the reactionary congestion is more marked than the primary and is with more difficulty relieved. In the cases in which the adrenalin chloride does sufficiently blanch the tissues it affords a clear field for operation, which is of the greatest advantage in nasal surgery.

One thing in favor of adrenalin chloride is that in the cases in which there are no bad local after-effects the patient can be allowed to use it freely without danger of forming a habit, as would be the case with cocaine.

Adrenalin can be readily sterilized by heat without deteriorating. Another advantage of the drug is that its action is largely peripheral. Adrenalin does not possess any antiseptic or anesthetic properties. Whatever relief from pain that it affords is due to lessened congestion. In conjunction with cocaine it probably prolongs the anesthetic powers of the latter drug by contracting the small arterioles and retaining the cocaine in the tissues, thus preventing toxic effects from too rapid absorption of the cocaine into the system at large.

Diagnostic Uses.—In a majority of cases the adrenalin seems to be a more powerful vasoconstrictor than cocaine. In conjunction with cocaine it is a valuable aid to diagnosis in determining the variety of inflammation of the mucous membrane. Hyperemia is due to a vasoparesis, and the adrenalin promotes vasoconstriction. When there is no diminution in the size of the vessels after the use of the adrenalin the inference is that the vasoconstrictor apparatus has lost its excitability. This is seen in the cyanotic conditions and in cases of long-continued hyperemia. For the relief of certain cases of deafness as well as from the standpoint of diagnosis where the middle turbinate is enlarged, the suprarenal is surely of great value and is of as great importance as cocaine; by shrinking the engorged tissue and opening the Eustachian orifice, if the case be an acute one, the improvement afforded to hearing is almost instantaneous. If the tissue, however, is hyperplastic, the adrenalin will not shrink it. When Politzerization of the tube is necessitated and the mucous membrane is swollen and engorged, the application of the adrenalin some fifteen or twenty minutes before inflation is of great value.

Therapeutic Uses.—I have seen attacks of acute coryza relieved by one or two applications, while on the other hand I have seen

such cases matle decidedly worse. In hay-fever I have had in the majority of cases unfavorable results. In operative cases I have been able in some instances to do a practically bloodless operation with no severe secondary hemorrhage. This was, however, in cases in which the cutting did not involve deep structures. While on the other hand I have met with instances in which the application seemed to have no effect whatever in lessening the amount of bleeding, or when it did have, was followed by marked hemorrhage some hours after operation. If considerable cutting has to be done, as for example in the straightening of a septum, where it is impossible not to sever some of the larger arteries, it is certain to be followed by severe hemorrhage. This has often been referred to as *secondary* hemorrhage following the use of the adrenalin, when in fact it is the primary hemorrhage which has been delayed and comes on as a result of the passing off of the effect of the adrenalin. Personally I prefer to see the bleeding vessel, no matter how small it may be, during the operation, and to check the hemorrhage then, rather than to be called out at two o'clock in the morning to check the bleeding. Some operators obviate this by packing the nostril firmly at the time of operation. This however is, I think, a questionable procedure, as it is impossible to render the nasal cavity thoroughly aseptic, and the plug only serves as a nidus for infection; in addition, its removal necessitates irritation of the wound. As the hemorrhage does not come on for some three to six hours after operation, the then saturated plug is not as effective a means of stopping the hemorrhage as a recent plug, and this entails the removal of the plug and repacking.

The question naturally arises, in regard to the hemorrhage following an operation in which both cocaine and adrenalin have been used, whether it was due to the cocaine or to the adrenalin. I believe that in either case there is sure to be reactionary hemorrhage, which will be greater in whichever instance the more marked contraction is produced. As adrenalin unquestionably produces the most marked constriction of the vasomotor apparatus, the old physiological law that to every action there is a reaction would be proportionate.

In several cases in which I used the solution before operating I had more sloughing of tissue than the small amount of trauma necessitated by the operation should have produced. It may be unfair to charge the adrenalin with this ill effect, but I have not had the same amount of sloughing in cases in which I have not used it. When such necrosis occurs the process of healing is a slow one. For the arrest of hemorrhage after the removal of polypi and adenoid vegetations the adrenalin solution is unquestionably of great value in many cases. As a hemostatic in operations on the middle ear I think it is of much more value than it is in the nasal mucous membrane. It must be remembered, however, that there is a much less generous blood-supply to be controlled in the former case than in the latter. In simple ulcers of the septum, or of the buccal or pharyngeal mucous membrane, especially if accompanied by slight oozing, it is of great value. But as a hemostatic in nasal bleeding or bleeding following operations it is a very uncertain factor.

Adrenalin in conjunction with formalin I have found useful in chronic suppurative otitis media, where it is a valuable aid in securing permanent drainage by keeping open the Eustachian tube. In edema of the larynx in its early stages it is of undoubted value; but since in the majority of cases the edema is secondary to some other condition and the adrenalin will not reach the primary cause, unless the latter be recognized and treated the edema is liable to return with renewed vigor.

I have had fairly good results from its use in the treatment of diseased conditions of the accessory sinuses, especially the antrum of Highmore. In suppurative conditions, after puncturing and washing out the antrum, the application of adrenalin, 1:10,000, unquestionably retarded further pus formation. In suppurating conditions, after thoroughly cleansing, its application would prevent any absorption of toxic material. The solution acts very nicely on the edematous mucous membrane so often seen in the middle turbinate. In many cases of acute rhinitis, pharyngitis, and tonsillitis it is of great service in reducing the swelling and rendering the patient more comfortable, provided its use is not followed by secondary congestion. If, however, such should occur, it will only aggravate the symptoms which one is endeavoring to relieve. A number of writers have recommended its use in acute inflammatory conditions of the larynx, and

while I have had good results in some instances the drug is too uncertain in its action to warrant its promiscuous use in this important organ.

Its use has been recommended in atrophic rhinitis on the theory that as a secondary effect it tends to congest the tissues and improve their blood-supply. This surely supports the theory of the secondary congestion.

Various articles written on the use of suprarenal in the treatment of diseases of the nose, throat, and ear demonstrate very forcibly what I have said as to the great variance in observations.

Cheatham[24] reports that suprarenal in combination with orthoform has produced excellent results in hay-fever. Royce[56] observed no beneficial results from its internal administration in hay-fever. Locally at first it irritated the membrane, but later afforded some relief. Douglas[27] had most satisfactory results in the treatment of hay-fever with the suprarenal gland. He, however, calls attention to the fact that there is danger in its prolonged use, that the constant diminution of the blood-supply to the nasal mucous membrane may cause atrophy. He applied the gland in the form of a saccharated dried powder, five grains being insufflated in the nose every two hours.

The experiments of Oliver,[46] Schaefer,[46] Cleghorn, and others show that the extract stimulates muscle tissue. They maintain that its action is direct and that it does not act upon the nerve tissue.

Reichert[53] calls attention to the fact that the powerful vasoconstrictor action of adrenalin may explain the abscess formation which sometimes follows its use hypodermically. This confirms what I believe to have occurred in several cases after operation, where the slough was out of proportion to the injury to the mucous membrane. In accord with my own experience Mayer reports a few cases in which a slough similar to that after cauterization followed the use of adrenalin.

Newcomb[46] concludes that the use of the extract seems to heighten the effect which might be expected fom the local use of any drug, and while he recommends it in acute congestions he says that in certain chronic conditions it is merely a helpful adjuvant.

Swain[65] in speaking of adrenalin chloride has said that one drawback in its use is the fact that only a limited area, that to which the solution is directly applied, is affected, and that its contractile effect is less pronounced than that of cocaine. While this has been my observation in some cases, the majority of cases have shown largely the opposite action.

Booth[19] reports excellent results from its use in a case of nasal hydrorrhea.

Curtis,[10] Peters,[51] and Chayney[23] all recommend a spray of suprarenal extract in tubercular laryngitis, claiming that it relieves the sensitiveness of the parts and lessens the pain.

It is recommended very highly by Floersheim for the relief of cough due to pharyngeal or laryngeal irritation. He administers it in powder form in three-grain doses.

Swain[65] and Osborn[49] recommend it as an abortive treatment of tonsillitis.

Ingals[35] has found it highly advantageous in epistaxis, congestion and edema of the larynx, acute coryza, and chronic laryngotracheitis; while S. Solis-Cohen[26] reports acute edema of the uvula, palate, pharynx, and epiglottis following the excessive use of adrenalin with chloretone.

Burnett, in his paper before the College of Physicians in December, 1901, reported the most disastrous results, not only systemic but local, from the use of adrenalin chloride, 1:1000, in the nose and pharynx. The solution was employed in the atomizer, and the strong solution was used by mistake.

Casselberry[22] maintains that the constriction is followed by relaxation. If this is true there must necessarily be secondary congestion of the part, and this agrees with my observations. In acute rhinitis he found that in some it afforded almost immediate relief, while in others it only increased the irritation.

Mandeville[15] was the first to administer the drug internally for the control of hemorrhage during nasal operations. He maintains that it was entirely successful.

Somers[61] concludes that it diminishes postoperative swelling. This has not been my experience, as in many instances it increased the swelling in the surrounding structures.

Many writers recommend its use in all nasal operations and prevent after-hemor-

rhage by tightly packing the nostrils. Unfortunately in operating on the pharynx, tonsils, or larynx, we cannot resort to packing. I believe that the hemorrhage which comes on a few hours after operation is more severe and difficult to control than that which occurs during the operation under cocaine. However, in some cases this after-hemorrhage does not occur. Royce[56] reports its use in two cases for the control of hemorrhage during operation. Both were successful and were not followed by subsequent bleeding.

Reynolds[54] finds it a powerful hemostatic, and recommends its use in all forms of inflammation of the mucous membrane.

Hopkins[34] and Swain[34] both report hemorrhage occurring several hours after operation in which the suprarenal was used.

Bates[15] states that its internal administration is useful in the treatment of hemorrhage of any kind. The philosophy of this I certainly cannot see. Given internally it produces a rapid rise of blood-pressure, and the supposition would be that when there is hemorrhage from a mucous membrane the suprarenal would only increase the hemorrhage on account of the rise in pressure. In spite of reports for this reason I should hesitate to use it in pulmonary or other hemorrhage, the site of which must be reached through the circulation.

The general consensus of opinion is that it has little if any anesthetic effect. Vansant[60] claims that if the suprarenal solution is thoroughly applied by means of cotton-wool the usual anesthetic effect of cocaine is increased and prolonged, and is equivalent to that produced by a very strong solution of cocaine without the ill effects following the use of the latter.

Harmer[33] believes the suprarenal extract of great value as an anesthetic, but has found it of only little value as a hemostatic. This is in a great measure a direct contrast to the observations of the majority of writers.

Mandeville[16] has been able to relieve chronic nosebleed by the internal administration of the drug in three-grain doses three times daily.

Moore[15] reports a case of epistaxis associated with organic heart disease in which the local and internal use of the suprarenal gland completely checked the bleeding.

Lermitte[40] reports most favorable results obtained by its application in nasal hemorrhage in children.

Fetterolf (personal communication) has had most excellent results from its use in a case of nasal hemorrhage where a mass of distended vessels existed.

Kellogg[15] reports a case of hemophilia in a child one year old in which the local application as well as internal administration of the drug gave almost immediate relief, in thirty-six hours. It is difficult to explain how it acts in hemophilia. According to Mackenzie[41] in this condition there is a congenital hypoplasia of the vessel walls, including the muscular coat. Theoretically the suprarenal extract would scarcely have the desired action on the vessel wall; however, a number of cases have been reported in which it did arrest the bleeding.

Oppenheimer[47] concludes:

It is of value only locally in hay-fever.

It is of value in epistaxis both of traumatic and of visceral origin.

It is of value in postoperative swelling.

It is of value in secondary hemorrhage.

It is of value in acute or chronic local congestions.

It is of especial value in all operations on the upper respiratory tract. The anemia remains one to five hours. The adrenalin prolongs anesthesia by preventing hemorrhage and loss of cocaine from the tissues.

It has no effect on the blood.

It is non-irritating.

It can be safely placed in the hands of patients.

It may be repeatedly used without losing its effect.

It is contraindicated in anemic processes and in conditions in which the mucous membrane has a low degree of vitality. In these conclusions he makes no exceptions.

One case has been reported in which the adrenalin chloride and the suprarenal gland extract were used locally or internally in the treatment of snoring. The relief experienced is easily explained, for if the solution contracted the tissue of the postnasal and nasal mucous membrane it would allow the free passage of air through the normal respiratory tract, al-

lowing the air to pass through the nostrils, thereby preventing flapping of the soft palate. I have seen such cases relieved by it.

As a mouth-wash, where the gums are bleeding or ulcerated, in a gouty condition, it is of great value. The adrenalin chloride 1:10,000 diluted in equal amount of water is of sufficient strength.

In an unsigned article in the *New York Medical Journal* of February 22, 1902, on "A Warning Concerning Suprarenal Medication," there are a number of points worthy of consideration, as follows: "There is a question whether or not suprarenal may frequently cause secondary hemorrhage or induce a 'doughy' engorgement of the erectile tissue of the nose worse than the original coryza. A fresh case of influenza with severe coryza is a distinct contraindication to its use. The drug sets the apertures to all the cranial sinuses gaping, and if the patient unguardedly uses his handkerchief while the mucous membranes are under the influence of the drug, bacteria will certainly be blown into the antrum of Highmore, probably into the ethmoid cells and the middle ear and possibly into the frontal sinuses as well. Cases of this kind with resultant empyema of all the sinuses named are already on record."

In reviewing the literature on the use of the suprarenal in various forms of diseases of the nose and throat there is such a marked difference of opinion in the honest detailed reports of the various writers that one must necessarily conclude that such difference of opinion cannot be due to faulty observation. It must be due to the difference of action and reaction of the drug. It must be taken into consideration, however, that the various writers *might* have *differed* as to the *diagnosis* of certain cases.

In conclusion I would say this, that in my own experience with all the conditions above mentioned in which the remedy has been used, in probably sixty or seventy per cent of the cases it has been beneficial, while in the others it has either been worthless or has produced irritating effects, or brought about a condition which to my mind was as difficult to control and usually more distressing to the patient than the original condition which I sought to relieve.

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THE RATIONAL TREATMENT OF MOVABLE KIDNEY AND ASSOCIATED PTOSES.

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The treatment of nephroptosis from a surgical standpoint has been accorded such undue prominence that it is my purpose to review that subject from a higher and broader plane, viz.:

1. That the symptom complex cannot be accounted for on the ground of simple mobility of the kidney.

2. That nephroptosis is nearly always associated with ptosis of other abdominal and pelvic viscera, subnormal nutrition, and nervous instability.

3. That treatment, to be successful, must be directed toward the replacement of the viscera, the correction of functional derangements, improvement of general nutrition, and support of the prolapsed organs.

Of late years it has been customary to speak of two varieties of wandering kidney, viz., floating and movable.

Floating kidney is a congenitally misplaced organ which has never occupied its normal bed, hanging suspended by its vasculo-ureteral pedicle, wholly covered with peritoneum, capable of oscillating to any position, and but rarely inducing symptoms.

A movable kidney, on the other hand, represents an organ which has been dislodged from its normal bed, acquiring an abnormal range of up-and-down motion behind the peritoneum and colon, and may be found at any point between the chondral border of the eighth rib and the floor of the true pelvis of the corresponding side of the abdominal or pelvic cavity; changing, vacillating with every breath, on coughing, sneezing, laughing, or crying, and with every change from the prone to the vertical posture. Exceptionally it becomes attached in its newly acquired location, from which it cannot be dislodged.

Movable kidney has been met with in infants (Stille and Fisher), is not uncommon during childhood and adolescence (Knoepfelmacher, Comby), and is estimated to be present in from 10 to 56 per cent of all young and middle-aged women (Edebohls, Einhorn, Harris, McNaughton). Observers widely differ as to the relative frequency in the sexes, but Kuttner's collection of 667 cases showed 12.5 per cent men to 87.5 per cent women. The right kidney is found movable from eight to thirty-five times as often as the left (Keen, Landau, Einhorn, Gallant), both kidneys being movable in from 10 to 20 per cent of all cases.

Symptom Producing Movable Kidney.—While according due weight to the facts enumerated above, we must not forget (*a*) that normally the up-and-down motion of the kidney is from three to five centimeters (Albarran, quoted by Moullin); (*b*) that only about five per cent of these cases really suffer from this mobility; (*c*) that minor degrees of displacement frequently cause most intense suffering, whereas a kidney lying on the false pelvis may not induce any symptoms referable to that organ; (*d*) that the chief source of pain, etc., is due to the remittent character of its excursions, and accounts for the inconsistency of the symptoms and suffering.

A composite picture of several nephroptopics shows an anemic, poorly nourished young woman, of slender physique, with care-worn expression, giving a history of dyspepsia, constipation, headache, nervousness, restlessness, sleeplessness, uncertain temper, easily pleased or angered, spasmodically energetic, quickly exhausted from slight effort, physical or mental, forgetful and unable to concentrate her attention on any subject, an enigma to parents and friends, and not infrequently to her physician.

From pains she has suffered without number: cardiac, epigastric, hypochondriac, right iliac, down the thigh, between the shoulders, along the loin, sacral, here to-day, there to-morrow, coming and going without apparent rhyme or reason; headache—orbital, supraorbital, frontal, sagittal, occipital—these, with abdominal distention, palpitation of the heart and abdominal aorta, an inability to tighten or wear corsets, with occasional attacks of nausea, vomiting, obstipation, jaundice, anuria, or polyuria (Dietel's crises), combine to render her life not worth living.

My experience agrees with the observations of Becker and Lenhoff, who were able to predict from the general appearance of the body form whether the kidney would be palpable or not; and with M. L. Harris, who by actual measurements found this to be the fact.

Another but less common type is found in middle-aged women, the mothers of one or more children, with lax, flabby, or somewhat pendulous abdominal walls covered with a moderate amount of adipose tissue, who in other respects present the same inconstant symptoms as their nulliparous sisters.

The history of a nephroptopic in a few instances dates from a fall or a blow in the kidney region, or following some unusual effort (lifting, coughing, sneezing, labor, etc.), but in most cases has been of gradual development and of some years' standing, the patient having migrated from one medical man to another, perhaps she has been operated upon by the gynecologist, consulted with the neurologist, run the gauntlet of the so-called health resorts, experiencing temporary relief, only to fall back into that "slough of despond," neurasthenia or chronic invalidism.

A review of the literature and careful study of several hundred personal cases compel one to adopt the conclusions of Glenard (1893), later confirmed by many careful observers, that as a rule nephroptosis is not alone in producing so lamentable a condition, but is rather a coincident (Kuttner) or associated factor in the enteroptosis or splanchnoptosis (Einhorn); thus we find certain symptoms referable to the dislodged kidney dragging on its vasculo-ureteral pedicle, the common and cystic ducts, the pylorus and duodenum, the abdominal aorta and vena cava, and the celiac plexus (Meinert); respectively producing hydronephrosis (Bourcy, Elliot, Pool, Reisinger), nephritis (Noble), uremic coma (Glenard), pyloric stenosis (Bramwell), gall-stones, with or without jaundice (MacLagan and Treves, Holmes, Johnston, Morris, Raymond, Gallant, and others), colitis (R. T. Morris), duodenal colic (Glenard), pyloric stenosis (Bramwell), pulsus abdominalis, aortic bruit (Cordier), cardiac palpitation and pain, at times simulating angina pectoris, with a small rapid pulse, of high or low tension, and a well marked hemic bruit.

Downward displacement of the pyloric end of the stomach, sometimes reaching the pelvic brim (Bettman), contraction of the colon, and dilatation of the small intestines, both hanging below the normal level, bring about constipation with alternating diarrhea, and secondarily autoinfection, characterized by the coated tongue, hepatic torpor, dusky skin, anemia, dark, scanty urine, dysuria, frequent headache, general malaise, and defective vision.

Among other disturbances dependent on circulatory obstruction are remittent appendicitis (Edebohls), pelvic congestion (Goelet), amenorrhea, menorrhagia, metrorrhagia, dysmenorrhea, and occasionally vicarious menstruation.

Treatment.—It is difficult to conceive of a condition the treatment of which demands so much on the part of the patient of confidence and willingness to submit in every respect and coöperate in carrying out every detail; and of gentleness, patience, and perseverance on the part of the attendant and nurses.

1. Rest and quiet. Of the first import is rest in bed, absolute quiet, and freedom from worry and care, for from three to six weeks. The foot of the bed must be elevated to gravitate the kidney, stomach, etc., upward, relieving all tension, irritation, and dragging on the visceral attachments. An ordinary muslin abdominal binder, pinned very snugly, must be worn continuously during the whole period in bed.

2. Sleep. It may be necessary to insure restful sleep for the first few nights, to administer moderate doses of chloral (10 to 15 grains) and bromide (20 to 30 grains). As the patient becomes accustomed to confinement in bed she will sleep without drugs, and the longer the better.

3. Diet. (*a*) During the first few days all nourishment must be withheld, and a gallon of Poland, Missisquoi, or other spring water administered in doses of six ounces hourly, day and night, to wash out the kidneys, liver, and bowels. (*b*) When this has been thoroughly accomplished, as indicated by clearing skin, conjunctiva, urine, and absence of formed stools, and a general feeling of well-being, liquid food—cream and hot water, the various preparations of milk and beef, thin soups, artificial foods—is given, six ounces every two hours, the menu being so arranged and varied as to avoid the same article more than twice during the same day, unless particularly agreeable to the patient. (*c*) If during the third or fourth week the patient's general condition is good, the gastro-intestinal tract performing its function normally, semisolid nourishment, every three hours, all that can be relished, must be ingested with the ob-

ject of rapidly increasing flesh and weight. Usually, from the fourth or fifth week, solid food at meal-times, with six ounces of liquid nourishment interspersed, will cause an increase of weight.

4. Massage and exercise. General friction over the trunk, rubbing of the extremities, careful stroking below the hypochondrium to replace the kidney, and kneading the abdomen to stimulate intestinal activity. As soon as fluid diet is begun, active movements of the extremities by the masseuse will prevent loss of muscle, to be followed the next week by resistant movements; and during the last two weeks in bed the patient must be trained to carry out calisthenic movements daily, especial attention being directed to those which will tend to shorten and strengthen the abdominal and lumbar muscles. At no time must the patient assume the sitting posture without wearing a tightly fitting abdominal binder, held in place by perineal tapes or straps.

5. Tonics. For the weak heart and small pulse so commonly met with, I have derived the best results from the use of tablet triturates of nitroglycerin 1-200 grain, extract digitalis fl. 1 minim, tincture strophanthus 3 minims, strychnine 1-60 grain, reduced iron 1 grain, *ter die,* with 1-200 or 1-100 grain nitroglycerin every one, two, or three hours, in between, to relieve arterial tension and quiet the cardiac action. This may be continued for seven to ten days, and a tablet of iron, quinine, arsenous acid, and strychnine given, one after each meal, during the first week, 2 t. d. the second week, 3 t. d. the third week, 4 t. d. the fourth week, diminishing in the reverse order for the fifth, sixth, and seventh weeks. When this course is pursued the improvement in the heart's action and anemia is very gratifying.

6. Visceral support. As the general condition improves, manifested by natural sleep, good digestion, voluntary stools, clean skin, and a general sense of well-being, we must decide what measures are to be employed to prevent the patient from receding into her former unfortunate state. All authors agree that without means of supporting the prolapsed viscera, all of the symptoms will sooner or later return. The numerous failures to cure the patient after once or even twice sewing up the kidney are due to lack of stress and attention to this fact. As Lichty aptly expresses it, "the surgeon usually speaks of the number of cases successfully treated by (attempted) permanent fixation of the kidney, but very little is said by him of the disappearance of the nervous symptoms and ability of the patient to do her usual work after the operation." The real question is, has the patient been relieved of her numerous pains, of the gastritis, constipation, headache, and nervous manifestations?

Recently I have taken the position that from ninety to ninety-five per cent of women who suffer from movable kidney can be relieved without operation; that nephropexy does not cure the patient even if the kidney remains attached in its abnormal position; that nephrorrhaphy is not wholly free from mortality (Thompson, Keen, Albarran); that not infrequently it is followed by pain (R. T. Morris, Edebohls, McLagan, and Treves), at times so great as to compel removal of the kidney (Harris); that a considerable number relapse (Davy, Tuffier, Israel), even when sutured a second time (private communication), and among those of large experience in "hanging kidneys," Robinson, Israel, Tuffier, Kuster, and others now refuse or but rarely operate.

The Corset for Movable Kidney and Associated Ptoses.—No one familiar with the present method of adjusting the heavy skirts, etc., the tightly drawn belts, and figure-of-eight corsets exerting enormous pressure and constricting force at the waist-line, can for a moment question the harmfulness and capacity for displacing the large and small intestines, and distorting the stomach downward, disastrous pressure on the liver and kidneys, and indirectly interfering with the action of the heart and lungs so ably described by Dickinson, and referred to by Glenard, Le Grande, Kussmaul, and nearly every writer on this subject.

As early as 1893 Edebohls recognized the value of a snugly fitting corset in many cases of movable kidney, and its fitness has been appreciated by Montain, Wolkow, Lapthorn Smith, who have emphasized the importance of supporting the lower abdominal wall by this means. Recently Israel of Berlin and the writer, working independently, have sought to so make, fit, and put on a corset which will exert such pressure over the suprapubic area as to elevate the viscera and at the same time form a shelf at the waist-line for the kidney to rest upon,

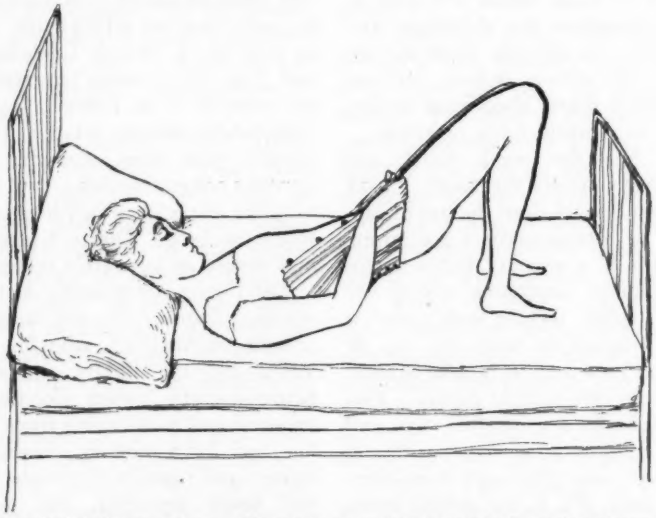
and which has proven successful in the hands of Beyea. The writer uses the same corset to replace abdominal binders after abdominal celiotomy, whether the incision be median or lateral, above or below the umbilicus, and fully agrees with Le Grande in its application to recently confined women and as prophylactic to enteroptosis in girls and young women and those who are encumbered with an abnormal amount of adipose tissue in the abdominal wall, relieving backache, improving the contour and general health, and affording much more freedom in respiration.

A corset constructed for these purposes must be as long in front as can be worn; it must be flattened over the suprapubic tri-

pads over the hips, and these if sewed inside the corset cannot be displaced, nor are they discernible when the woman is dressed.

When about to put on the corset the woman places it around the waist, lies down upon the bed, draws up the knees, and fastens the hooks from the lowest one upward. Before fastening the second catch she must raise the hips into a semiopisthotonos position (see illustration) to still further displace the viscera upward and facilitate the adjustment of the corset.

7. Operation. Early in the second week, if the patient is doing well, measures must be carried out for the cure of any pelvic disorders; tamponade for pelvic inflammation; Brandt's or other means for restoring a dis-



Semiopisthotonos posture: Woman lying on bed, hips raised, causing viscera to gravitate toward the diaphragm, when fastening corset for movable kidney, etc.

angle (bounded laterally by Poupart's ligament, and above by a line drawn from the anterior superior spine of one side to that of the other), exerting maximum pressure over that region, just enough contraction at the waist-line to support the kidney, and negative pressure above that point.

The corset must be cut from measurements taken while the patient is lying upon her back, and it will be found that owing to gravitation of the viscera upward toward the diaphragm the circumference on a level with the anterior superior spines will have decreased from three to six inches, the object being to retain the viscera in this portion of the abdomen.

A more rounded, graceful (fashionable) outline can be given to the figure by fitting

placed uterus, ovaries, and tubes; dilatation, curettage, and uterine drainage for dysmenorrhea, sterility, etc.; vaginal or abdominal section for tubal disease, or removal of pelvic neoplasms; the excision of hemorrhoids, cure of fissures or fistula *in ano;* examination and treatment of the bladder and urethra; repair of lacerated cervix and perineum; in fact, any procedure which will remedy or remove any source of suffering or irritation. When the patient has recovered from these repairs, examine the nose and throat and ears, and apply needed drugs, or remove polypi, adenoids, tonsils, etc., as absolutely essential to good health.

During the last week, or as soon as the patient can get outdoors, secure the services of an expert ophthalmologist to examine

the eyes and prescribe glasses, which must be worn as he directs.

In this way every possible source of irritation, pain, and suffering will have been removed, and the patient's health continue to improve during the following year or two, ere she can reap the full harvest of good health for which she has so earnestly sought.

Operations on the stomach may be rarely indicated—in extreme displacement of the stomach with or without dilatation, gastropexy (Bidwall), gastroplication (Bircher, Curtis, Horrocks, Weir), exploratory gastrotomy (Kocher, Morse), pyloroplasty, or gastroenterostomy.

If after a week or two in bed pain persists in the kidney region, with enlargement of the kidney, and there is pus, blood, casts, or renal cells in the urine, a careful cystoscopic examination of the bladder and catheterization of the ureters will determine actual disease of the kidney or ureter requiring surgical interference.

Neither nephropexy nor corset support of a movable kidney will avert, prevent, or cure remittent attacks of appendicular colic, etc., in an appendicitis induced by movable kidney, and the only resource when this is troublesome is to remove the appendix cæci.

RESUME OF THE RATIONAL TREATMENT OF MOVABLE KIDNEY AND ASSOCIATED PTOSES.

Days.	In bed.	Sleep.	Diet.	Massage.	Tonics.	Bowels.	Operations.
1st.....	Foot of bed elevated; snug abdominal binder worn continuously while in bed.	Chloral and bromide or other hypnotics to secure eight to twelve hours' sleep.	Spring water 6 ounces every hour.	Gentle friction over trunk; kneading abdomen once daily.	Nitroglycerin, digitalis, strophanthus, and iron.	Soap-suds enema, castor oil.	
2d.....							
3d.....							
4th.....			Fluid diet every two hours.			Saline laxative in hot water, 6 A. M. daily.	
5th.....				Passive motions.	Tablets, iron, arsenic, quinine, and strychnine, 1 to 4 after each meal.		On cervix, perineum, tubes, ovaries, rectum, bladder, nose and throat. Examine eyes; no reading until glasses fitted.
7th to 14th to 21st to 28th to..	Measured for corset.		Semisolid nourishment every three hours.	Active, resistant movements. Calisthenics.		Cascara and hydrastis, q. s.	
35th to 42d.....	Corset to be put on before getting out of bed.		Mixed diet *ter in die*, liquid food between meals.				

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ANTAGONISMS OF COCAINE AND MORPHINE, ESPECIALLY THEIR ACTIONS UPON GENERAL METABOLISM, AND THE EMPLOYMENT OF COCAINE IN MORPHINE POISONING.

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I. GENERAL CONSIDERATION OF COCAINE AS A MORPHINE ANTAGONIST.

Cocaine and morphine are so strikingly opposite in their most important actions that it seems remarkable that one has not had an extended trial in combating the lethal effects of the other, especially so as regards the use of cocaine in morphine poisoning in which the recognized methods have proved less effective than should reasonably be hoped for. Even a superficial study will show that in man the antagonistic actions of therapeutic doses of cocaine to those of lethal doses of morphine during the second and third stages of poisoning are of a decided and wide-spread character (Table I), and notably so as to the actions upon the respiratory movements, arterial pressure, body temperature, and psychic functions. The synergistic actions, on the other hand, are, with the exception of excitomotor and certain circulatory actions, unimportant. The reason why cocaine has not thus been made use of may not be owing so much to a failure to recognize its antagonisms, or to a recognition of its synergisms, as to the fact that it is one of those treacherous alkaloids which act at times, without apparent reason, with an intensity greatly disproportionate to the dose, thus giving rise to a fear of causing dangerous cocaine poisoning when quantities are used of suffcient size to be of probable value in cases of depression so profound as in morphine poisoning.

Table I.

Showing the principal actions of therapeutic doses of cocaine, and of toxic doses of morphine during the second and third stages of poisoning in man:

COCAINE.	MORPHINE.
Respiratory stimulant.	Depressant.
Direct cardiac stimulant.	Depressant.
Vasomotor stimulant.	Depressant.
Increases arterial pressure.	Decreases.
Excites general metabolic activity.	Decreases.
Increases body temperature.	Decreases.
Powerful thermogenic.	Powerful depressor.
Excitomotor.	Essentially a depressomotor.
Increases reflex excitability.	Decreases.
Muscle stimulant.	Depressant.
Psychic stimulant.	Depressant.
Pupilodilator.	Constrictor.

Comparisons of the actions of cocaine with those of the several recognized morphine antidotes seem to place the former unquestionably far in advance of any single agent excepting caffeine, which alone stands near it. Atropine and other belladonna preparations, which are almost universally recognized as the most important morphine antidotes, I have shown by clinical, toxicological, and experimental data (*Therapeutic Monthly*, May, 1901) to have a very limited and uncertain value, for while there is no doubt that morphine and belladonna are in various ways antagonistic, they are at the same time in many important actions synergistic, so that the employment of this substance or its chief active principle may not only be valueless, but dangerous, or even fatal. Statistics show that the death-rate in cases of morphine poisoning treated by belladonna preparations is much higher than in cases not so treated. Strychnine has found favor with some, but there is no evidence of its having any

marked usefulness unless pushed to the verge of a dangerous strychnine state (*Philadelphia Medical Journal*, March 9, 1901). The actions of this substance upon the respiratory, circulatory, and thermal functions resemble those of cocaine, but they are relatively decidedly feeble; both strychnine and cocaine are excitomotors, the former acting chiefly upon the spinal cord, and the latter upon the cerebrum; strychnine has little or no action upon the psychic centers, while cocaine is a powerful excitant; strychnine is very much weaker in its actions upon the muscular system, etc. In fact, from a purely theoretic aspect, strychnine is in every important way decidedly inferior to cocaine as a morphine antagonist. Caffeine, in the form of coffee infusion, is regarded as being almost a *sine qua non* in the successful treatment of morphine poisoning, a view that is fully justified by clinical and laboratory experience. Its physiological dissimilarities to morphine are almost identical with those of cocaine, but as a whole less marked. Faradization, friction, douches, and various other forms of cutaneous irritation, hot baths, etc., have been found to be of more or less value, but their limitations of usefulness are well defined. However far such comparisons are carried, the conviction only becomes the stronger that cocaine of all single agents that have been proposed or used as morphine antidotes stands out boldly as the most promising.

In an article in the *Philadelphia Medical Journal* of March 9, 1901, I called attention to the probable value of cocaine in morphine poisoning. Since then a case has been reported, the only one on record as far as I know, of morphine poisoning treated solely by cocaine. This case occurred in the practice of Dr. Barnes (*Philadelphia Medical Journal*, Dec. 21, 1901). "The patient, a girl of seventeen, when seen, was apparently moribund. A hypodermic injection of one-half of a grain of cocaine was given. No marked improvement being noted at the end of a half-hour, a second dose was administered. The effects of the cocaine were plainly evident ten minutes after the second injection. The pulse and respiration became more rapid, and the patient showed signs of returning consciousness. However, there was not enough improvement to indicate that the stimulation had been sufficient, and it was therefore deemed advisable to give a third injection of cocaine. One-quarter of a grain of cocaine hydrochlorate was administered accordingly, with the result that within ten minutes the patient became conscious, the respiration and pulse (recorded at five-minute intervals) increased to 20, 46, and 80, respectively, per minute. It would have been ideal if these conditions had continued, but within half an hour after the third injection of cocaine the patient was garrulous, partly delirious; her heart-beats registered 180 per minute; her respirations were quick, short, and jerky; and she had tonic and clonic convulsive movements of the arms and legs. She had received *in toto* one and a quarter grains of cocaine. The case was now one of the first stage of cocaine poisoning. The convulsive effects of the cocaine passed away in the course of an hour, followed by recovery." There can be no reasonable doubt that the patient's life was saved by the cocaine.

This happy result naturally suggests the question: In what way or ways was the cocaine effective? It will be admitted that morphine kills almost without exception by paralyzing the respiratory center, yet it is a question, as pointed out by the writer elsewhere (*Philadelphia Medical Journal*, March 9, 1901), as to what extent this paralysis is due to direct and indirect actions. In the consideration of this subject it was held that "if it be conceded that morphine acts directly upon those processes of the center which are specifically concerned in the discharge of respiratory impulses, it must also be admitted that this action must be reënforced by the enfeeblement of the circulation, by the lowered temperature, and probably by a universal depression of metabolism that not only directly but indirectly affects both anabolic and catabolic processes generally. That morphine is a depressant of nearly all forms of metabolic action, both special and general, is evident from many facts. Its power to annul the pangs of hunger and to lessen the quantity of food required for subsistence; its lessening of the body weight; its weakening of the reproductive powers of habitués; its enfeeblement of the higher mental processes; and its depression of secretory, circulatory, respiratory, and muscular activity, and of body temperature, etc., all point to decrease of metabolic activity so wide-spread as to extend to those processes which are con-

cerned in internal secretion. If morphine be thus so extensive a depressant, it follows that in dealing with this poison we must consider not merely the direct actions upon the vital centers, but the indirect actions which result from the metabolic depression of remote and apparently unrelated structures, by which the centers may no longer be properly supplied with some special forms of pabulum or other substances that are essential to their normal activities."

Studies with morphine upon normal dogs show that general metabolism is profoundly depressed, and body temperature decidedly lowered, even by small doses, a twentieth to a fortieth of the average minimal lethal dose being sufficient to reduce on an average heat production 58 per cent, and body temperature 1.93°. In two experiments in which the dose in each was about a twenty-fifth of the average minimal fatal dose, heat production fell 84 and 85 per cent, respectively; and body temperature in two such experiments fell 2.77° and 3.66° respectively. It seems obvious from these significant results that the indirect actions of this profound depression of general metabolism, and of the attendant fall of body temperature, must exert a powerful influence as a depressant upon this center, and possibly be of even more importance than the direct centric action. Experience has at least shown, clinically and experimentally, that external heat, by means of which the body temperature serves to be maintained, is a strong factor in promoting recovery from morphine poisoning and other states of profound general metabolic depression. In fact, the depression of general metabolism is disproportionately severe in comparison with the effects upon the other important functions involved, which of itself is sufficient to warrant the belief that in morphine poisoning measures directed to maintain the mean standard of body temperature are not only of great importance, but should be directed as far as possible through a general metabolic excitation. Cocaine meets this indication better than any known principle of the Pharmacopœia, it being one of the most potent general metabolic excitants known. That this statement is well founded is supported by the results of experiments with this substance upon both normal and morphinized dogs, the condensed records of which are embodied in this paper.

When dogs are given morphine in doses *sufficient to develop a well marked second stage of poisoning*, there occurs a state of profound psychic, motor, and thermal depression like that observed in man during the second and third stages. If cocaine be administered with the morphine, or subsequently, there appear within a variable time, ranging from a few minutes to an hour or more, evidences of cocaine actions which are manifested in varying degrees of psychic and motor agitation, an increase of body temperature, etc. In some animals the apathy, the intense muscular weakness, and the marked fall of body temperature caused by the morphine may almost, if not completely, mask the actions of the cocaine; in others, these effects are soon superseded by the typical intense psychic and motor excitement and the marked rise of temperature caused by cocaine; in others, and in most cases, the effects of the two poisons are both well marked, so that there exists coincidentally muscular weakness and muscular excitement, psychic depression and psychic excitement, etc. Even after large doses of cocaine the decided typical effects of this substance may be delayed, and when they are present they may be developed to a variable degree, ranging from comparative feebleness to extraordinary intensity. These variabilities are doubtless owing in a large part to differences in the susceptibilities of different animals to one or the other, or both, of these poisons.

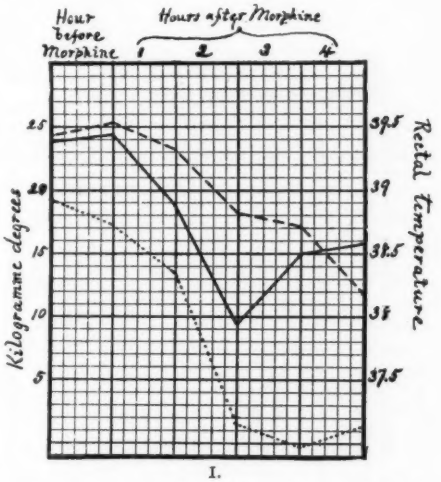
After doses of morphine just short of the minimal lethal quantity, cocaine in any dose intensifies the toxic state. In the dose of 0.2 gramme per kilo of body weight, morphine is rarely fatal in ordinarily robust dogs, yet if this dose is combined with 0.01 gramme of cocaine per kilo of body weight, which is less than one-half of the mean minimal fatal dose, it is almost invariably lethal, especially so if the cocaine be given during the latter part of the second stage, or at any time during the third stage. This fact might seem to set aside at once any likelihood of cocaine being of value as a morphine antidote in man, but in the latter the conditions are somewhat different from those which exist in the dog and certain other animals. In morphine poisoning there is developed a coexistent state of paralysis and motor excitation. In the cat and certain other animals the latter completely masks the former, so that the second and third stages are stages of convulsions.

In the dog motor disturbances begin in the midst of profound weakness during the second stage, and convulsions are typical of the third stage. In man, both the second and third stages are periods of motor depression, except in rare instances. The explanation of this synergistic action of cocaine, so marked in the dog, by which the toxic state is intensified, is in its excitomotor action, this developing the excitomotor condition caused by the morphine. In other words, we have the excitomotor effects of the cocaine coupled with like effects of the morphine, which together completely supersede the depressomotor effects of the morphine. In man, the convulsant action of morphine is so feeble and so rarely observed that there is little danger of the untoward synergistic effects seen in the dog, so that the antagonistic actions in general may go on uncompromised in this way. In the case reported by Dr. Barnes, however, only one and one-fourth grains of cocaine was given, which is about a twelfth to a tenth of the mean minimal lethal quantity in man, yet a dangerous convulsive state was developed. This may have been due to a marked susceptibility of the patient to cocaine, or to an unusual degree of excitomotor stimulation by the morphine, or to both. The appearance of clonic and tonic convulsive movements after so moderate a dose of cocaine, together with the fact of the existence of a masked excitomotor action of morphine in man, should make one cautious about administering large doses of powerful excitomotors like cocaine and strychnine in morphine poisoning.

II. THE ACTIONS OF MORPHINE, COCAINE, AND MORPHINE AND COCAINE UPON GENERAL METABOLISM AND BODY TEMPERATURE IN DOGS.

In no respect are the antagonisms of morphine and cocaine more marked than upon general metabolism and body temperature—morphine is a powerful metabolic and temperature depressant; cocaine, the reverse. It follows from this that the nature of the results caused by the coincident actions of these two poisons must vary with the doses employed and the varying susceptibilities of different individuals to one or the other, or both, of these agents. For the sake of clearness the effects of morphine upon normal animals will first be considered, then those of cocaine, and finally both conjointly.

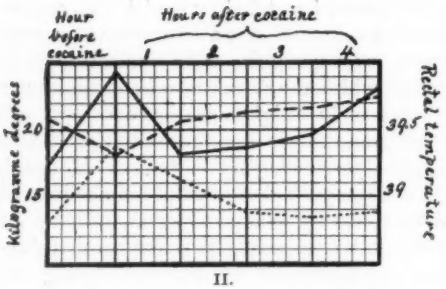
(a) The actions of morphine sulphate upon general metabolism and body temperature on normal dogs. In twelve experiments with morphine upon normal dogs, in ten of which the dose was 0.01 gramme per kilo of body weight, and in two 0.075 and 0.15 gramme per kilo, respectively, it was found *(Philadelphia Medical Journal,* March 9, 1901) that general metabolism, as determined by heat production, falls on an average 26 per cent below the normal during the first hour, 62 per cent during the second hour, and 40 per cent below the normal during the third hour. Rectal temperature in these experiments fell on an average 0.39° during the first hour, 1.19° during the second hour, and 0.18° during the third hour, making an average total fall of 1.76°. The mean effects upon heat production, heat dissipation, and body temperature are exhibited in Chart I.



I.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (– – – –); and the curve of temperature by a dotted line (.....).

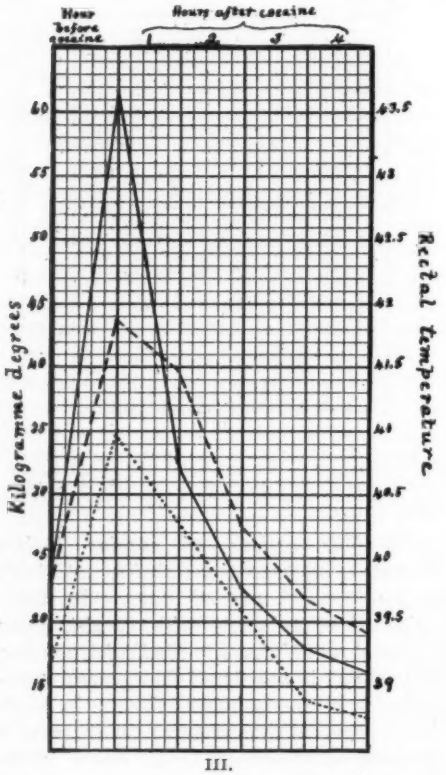
(b) The actions of cocaine hydrochlorate upon general metabolism and body temperature of normal dogs. In three series of experiments with cocaine upon normal dogs *(University Medical Magazine,* May, 1889) it was found that general metabolism is distinctly increased, even by small doses, and that the extent of the increase is proportional to the size of the dose. In the first series (Chart II) the dose was 0.0025 gramme per kilo of body weight, which is about one-tenth of the average minimal lethal quantity. The mean maximum increase of heat production occurred during the first hour after the cocaine, reaching



II.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

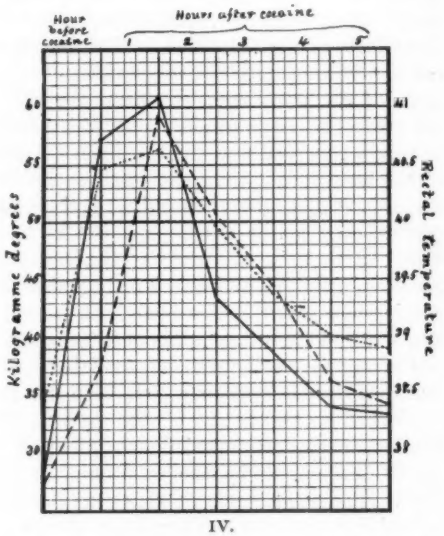
about 40 per cent; and the mean maximum average increase of rectal temperature was during the same period about 0.55°. During the subsequent hours of the experiments heat production and body temperature remained somewhat above the normal. In the second series (Chart III) the dose was 0.01



III.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

gramme per kilo. The maximum increases of heat production and temperature were also observed during the first hour, the mean increase of the former being 146.9 per cent, and of the latter 1.81°. Heat production continued hypernormal during the second hour, but became subnormal during the third hour, and continued subnormal during the remaining hours of the experiments. Body temperature remained above the normal for three hours, and fell below the normal during the fourth hour. In the third series (Chart IV) the dose was 0.02



IV.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

gramme per kilo. The maximum increases of heat production and temperature were not noted until the second hour—the mean maximum increase of heat production being 105 per cent, and of rectal temperature 2.19°. Both continued hypernormal during the following hours of the experiments. While this larger dose, judging solely from the maxima of the rises, was apparently less effective as a thermogenic, it was in fact more so, for the reason that the metabolic excitation continued over a much longer period, and gave rise to a far greater total increase of heat production. In the first series the mean increase in the total number of kilogramme degrees was 1.34 kilogramme degrees per kilo of body weight; in the second series, 5.39; and in the third series, 8.58. In the first series heat production continued hypernormal throughout the entire period of the experiments; in the sec-

ond series it was hypernormal during but two hours; and in the third series it was hypernormal during a period beyond that of the experiments. The increase of heat production caused by cocaine is, I have found, due in part to motor excitement and in part to other actions.*

(c) The actions of cocaine hydrochlorate upon general metabolism and body temperature in morphinized dogs. In nine experiments with cocaine upon morphinized dogs the results in every instance were positive and uniform in showing that cocaine is not only sufficiently powerful to prevent the profound depression of general metabolism and temperature caused by morphine, but that it may increase both above the normal to a variable degree, the extent of which depending largely upon the size of the dose of cocaine. They also show that, as a rule, cocaine is both relatively and absolutely more powerful as a metabolic excitant in morphinized than in normal dogs—a fact that may be of significance in relation to the hypothetical actions of morphine upon the processes of internal secretion. The condensed records of these experiments will be found in Table II, a study of which will show that owing to certain peculiarities of the results the several experiments naturally fall into three groups: The first group is characterized by a combination of cocaine and morphine effects which so nearly equal each other in intensity that there did not

TABLE II.

Condensed records of nine experiments with cocaine upon morphinized animals on heat production, heat dissipation, and body temperature.

Experiment No. 1.—Dog, weight 13.72 kilos: 0.01 gramme morphine per kilo, and 0.0025 gramme cocaine per kilo, subcutaneously.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or −.	
First hour before morphine	29.537	29.208	38.48	38.51	+0.03	Quiet.
Second hour before morphine	29.369	32.332	38.51	38.24	−0.27	Quiet.
First hour after morphine	24.962	28.584	38.24	37.91	−0.33	Quiet and weak.
First hour after cocaine	25.191	26.508	37.91	37.79	−0.12	Quiet and weak.
Second hour after cocaine	29.233	21.660	37.79	38.48	+0.69	Restless and weak.
Third hour after cocaine	25.489	25.050	38.48	38.52	+0.04	Very weak and jerky.

Experiment No. 2.—Dog, weight 12.57 kilos: 0.01 gramme morphine per kilo, and 0.0025 gramme cocaine per kilo, subcutaneousiy.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or −.	
First hour before morphine	24.247	23.040	38.61	38.73	+0.12	Quiet.
Second hour before morphine	23.043	23.445	38.73	38.69	−0.04	Quiet.
First hour after morphine	12.708	20.250	38.69	37.94	−0.75	Quiet and weak.
First hour after cocaine	23.912	16.875	37.94	38.64	+0.70	Restless.
Second hour after cocaine	78.394	47.925	38.64	41.67	+3.03	Very restless, panting, weak.
Third hour after cocaine	45.121	52.955	41.67	40.89	−0.78	Very restless, panting, weak.

Experiment No. 3.—Dog, weight 14.4 kilos: 0.01 gramme morphine and 0.0025 gramme cocaine per kilo, subcutaneously.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or −.	
First hour before morphine	40.222	41.950	38.52	38.37	−0.15	Quiet.
Second hour before morphine	40.758	42.486	38.37	38.22	−0.15	Quiet.
First hour after morphine	31.393	33.812	38.22	38.01	−0.21	Quiet, weak, restless.
First hour after cocaine	57.462	53.430	38.01	38.36	+0.35	Restless and weak.
Second hour after cocaine	62.862	47.886	38.36	39.39	+1.03	Very restless.
Third hour after cocaine	67.580	63.318	39.39	39.76	+0.37	Much psychic excitement; very weak.

*See current issues of *Philadelphia Medical Journal.*

Experiment No. 4.—Dog, weight 9.7 kilos: 0.01 gramme morphine and 0.01 gramme cocaine per kilo, subcutaneously.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or —.	
First hour before morphine.....	20.351	20.584	38.94	38.91	—0.03	Restless.
Second hour before morphine...	20.889	26.088	38.91	38.24	—0.67	Quiet.
First hour after morphine.....	15.093	16.878	38.24	38.01	—0.23	Quiet, weak.
First hour after cocaine.....	17.573	10.854	38.01	38.89	+0.88	Quiet, hallucinations.
Second hour after cocaine.....	61.796	44.026	38.89	41.18	+2.29	Very restless, weak, respiration 300.
Third hour after cocaine.....	27.392	34.066	41.18	40.32	—0.86	Restless, weak, respiration 250.

Experiment No. 5.—Dog, weight 12.65 kilos: 0.01 gramme morphine and 0.01 gramme cocaine per kilo, subcutaneously.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or —.	
First hour before morphine.....	21.802	22.842	38.81	38.71	—0.10	Quiet.
Second hour before morphine...	21.025	22.944	38.71	38.52	—0.19	Quiet.
First hour after morphine.....	18.326	21.962	38.52	38.16	—0.36	Quiet, weak, respiration 170.
First hour after cocaine.....	53.724	19.788	38.16	41.52	+3.36	Very restless, very weak, respiration 350.
Second hour after cocaine.....	12.744	22.968	41.52	40.29	—1.24	Restless and weak.
Third hour after cocaine.....	7.606	17.706	40.29	39.29	—1.00	Quiet, weak, respiration 145.

Experiment No. 6.—Dog, weight 19 kilos: 0.01 gramme morphine and 0.02 gramme cocaine per kilo, subcutaneously.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or —.	
First hour before morphine.....	41.526	51.984	38.91	38.82	—0.09	Quiet.
Second hour before morphine...	38.502	40.770	38.82	38.68	—0.14	Quiet.
First hour after morphine.....	33.210	37.098	38.68	38.44	—0.24	Quiet, weak, respiration 100.
First hour after cocaine.....	28.434	25.356	38.44	38.63	+0.19	Quiet, weak.
Second hour after cocaine.....	31.524	29.094	38.63	38.78	+0.15	Quiet, weak.
Third hour after cocaine.....	63.378	36.810	38.78	40.32	+1.64	Restless, too weak to stand, resp quiet.

Experiment No. 7.—Dog, weight 16.54 kilos: 0.01 gramme morphine and 0.02 gramme cocaine per kilo, subcutaneously.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or —.	
First hour before morphine.....	42.092	47.400	38.38	38.43	—0.25	Quiet.
Second hour before morphine...	44.016	44.778	38.43	38 38	—0.05	Quiet.
First hour after morphine.....	39.375	52.740	38.38	37.37	+1.01	Restless.
First hour after cocaine.....	39.835	39.306	37.37	37.41	+0.04	Quiet.
Second hour after cocaine.....	54.138	40.906	37.41	38.41	+1.00	Quiet.
Third hour after cocaine.....	85.136	64.362	38.41	39.98	+1.57	Very restless.

Experiment No. 8.—Dog, weight 10.21 kilos: 0.01 gramme morphine repeated once, and 0.01 gramme cocaine, per kilo, subcutaneously.

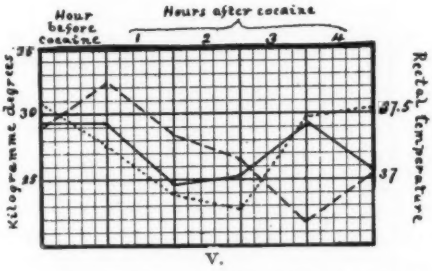
	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or —.	
First hour before morphine.....	18.969	20.358	38.78	38.61	—0.17	Quiet.
Second hour before morphine...	20.631	18.834	38.61	38.83	+0.22	Quiet.
First hour after morphine.....	10.826	19.974	38.83	37.71	—1.12	Quiet.
First hour after cocaine.....	58.407	30.636	37.71	41.11	+3.40	Very restless.
Second hour after cocaine.....	12.075	25.062	41.11	39.52	—1.59	Quiet.
Third hour after cocaine.....	5.389	13.230	39.52	38.56	—0.96	Quiet.

Experiment No. 9.—Dog, weight 11.69 kilos: 0.01 gramme morphine repeated once, and 0.01 gramme cocaine per kilo, subcutaneously.

	Hourly heat production.	Hourly heat dissipation.	Rectal Temperature.			Remarks.
			Beginning of hour.	Ending of hour.	Loss or gain, + or −.	
First hour before morphine.....	18.145	22.166	38.89	38.46	−0.43	Somewhat restless.
Second hour before morphine....	19.901	20.490	38.46	38.29	−0.17	Quiet.
First hour after morphine.....	15.812	17.028	38.29	38.16	−0.13	Quiet.
First hour after cocaine	22.746	15.264	38.16	39.96	+0.80	Quiet.
Second hour after cocaine.....	21.157	18.726	39.96	40.32	+0.26	Quiet.
Third hour after cocaine.....	12.293	19.314	40.32	39.58	−0.74	Quiet.

occur either the marked metabolic depression of the morphine or the opposite effect of the cocaine; the second group, by the relatively and absolutely more powerful effects of the cocaine than in normal animals; and the third group, by the delay in the appearance of typical cocaine effects. In the first group are included Experiments 1 and 9; in the second group, Experiments 2, 3, 4, 5, and 8, and probably also Experiments 6 and 7; and in the third group, Experiments 6 and 7.

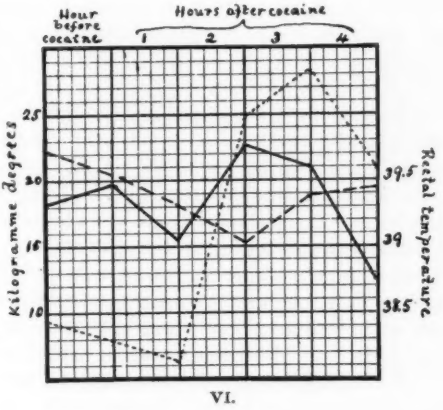
First Group: In Experiment 1 (Chart V) the fall of heat production following the



V.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

dose of morphine was about 18 per cent, or 8 per cent less than the average decrease in normal animals after the same dose. The dose of cocaine (0.0025 gramme per kilo), given at the end of the first hour after morphine, had but little effect beyond practically preventing the continuation of the morphine decline. In the morphinized dogs the mean decrease during this hour reaches 36 per cent; but in this experiment the cocaine limited the fall to 0.3 per cent, thus almost entirely counteracting the depressant action of the morphine. During the second hour after cocaine the normal standard of heat production was regained within a fraction



VI.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

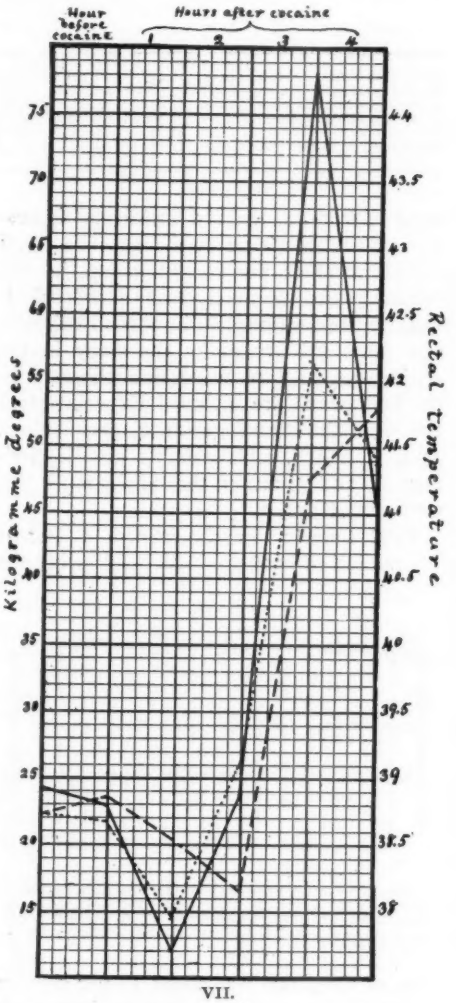
of a kilogramme degree, which was followed by a decrease. In Experiment 9 (Chart VI) two doses of morphine were injected, the second being given with the cocaine. The decrease of heat production during the hour after the first dose of morphine was about 26 per cent, which is the average. After the cocaine, with which was injected the second dose of morphine, heat production was increased only 43.8 per cent, as compared with the average increase of 146.9 per cent in normal dogs by a like dose. The cocaine was therefore much less effective in these dogs than in normal animals; and while the effects were comparatively feeble, they were nevertheless sufficient in one experiment to prevent, and in the other to entirely supersede, any marked depression of general metabolism by the morphine. In Experiment 1 the cocaine acted apparently feebly, yet actually its effects were more marked than the average in normal animals. The lack of power of cocaine in these experiments in comparison with its

actions upon normal dogs, and upon the morphinized dogs of Experiments 2, 3, 4, 5, and 8, has its explanation in the fact that the animals were practically free from the psychic and physical excitement and certain attendant conditions which were so strongly marked in the normal dogs, and in the other morphinized animals. The fact, however, that cocaine is capable of overcoming, in the absence of muscular excitement, the powerful depressant actions of morphine upon general metabolism must be of both clinical and physiological significance.

The effects on body temperature are also of much interest. In Experiment 1, after cocaine the temperature fell 0.12°; in morphinized dogs without cocaine the average fall during the same period was 1.19°, showing that the cocaine had powerfully antagonized, and almost absolutely set aside, the depressant actions of morphine. During the second hour after cocaine the temperature increased 0.69°; in morphinized animals without cocaine the mean fall during this period was 0.18°. Cocaine therefore not only prevented the morphine decrease, but caused a decided increase of temperature. In Experiment 9 the temperature during the first hour after cocaine was increased 0.8°, and during the second hour 0.26°, or a total of 0.34° above the normal.

An interesting fact shown in the results of Experiment 9 is the striking absence of even an approach to a proportional relationship between the alterations in heat production and body temperature. Heat production at the end of the second hour after cocaine was but 11 per cent above the mean of the two preceding hours following the injection of morphine, while the body temperature had increased during the same period 1.94°, a rise sufficient to indicate under ordinary conditions an increase of heat production ranging from 100 to 150 per cent.

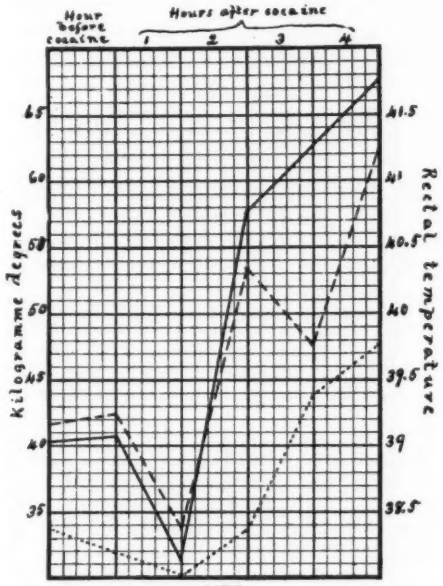
Second Group: In the five experiments of the second group (Experiments 2, 3, 4, 5, and 8) the effects of the cocaine were, as stated, more powerful, both relatively and absolutely, than in normal animals. (It is probable that Experiments 6 and 7 should also be included in this category, the observations having been concluded before the maximum effects probably occurred.) In Experiments 2 and 3 the dose of cocaine in each was 0.0025 gramme per kilo of body weight. In normal animals this quantity causes an average increase of 40.3 per cent of heat production during the first hour, 3.8 per cent during the second hour, and 8.5 per cent during the third hour. In Experiment 2 (Chart VII) the increase in the morphinized dog was 88.2 per cent during the first hour after cocaine, 516.9 per cent during the second hour, and 255.1 per cent during the third hour—an enormous excess. In Experiment 3 (Chart VIII), while the effects were remarkable, they were not so great as in the preceding experiment, heat production being increased 83 per cent during the first hour after cocaine, 100.2 per cent during the second hour, and 115.2 per



VII.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

cent during the third hour. The marked differences in the effects upon normal and cocaine-morphine animals is better shown in the effects on the number of kilogramme

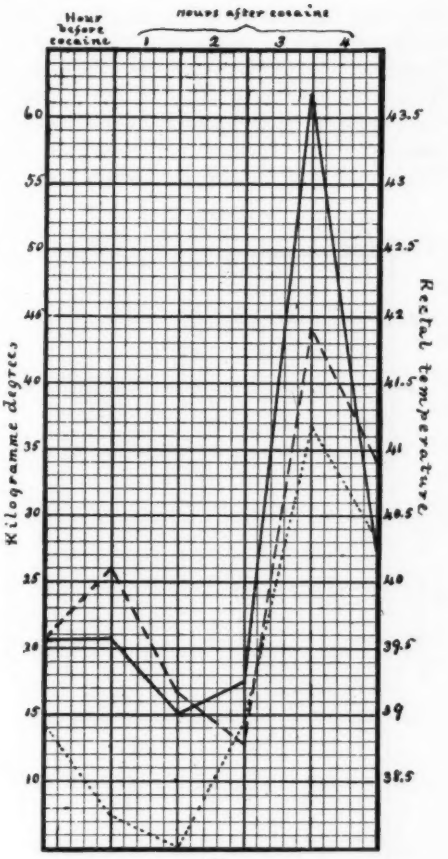


VIII.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (– – – –); and the curve of temperature by a dotted line (.....).

degrees. In normal animals the mean increase after this dose of cocaine was 1.34 kilogramme degrees per kilo of body weight; and in the morphine animals it was 1.5 kilogramme degrees per kilo of body weight, or 11 per cent more. In other words, cocaine was 11 per cent more powerful as a pyrogenic in these two morphinized dogs than in normal animals.

In Experiments 4 and 5 the dose of cocaine was 0.01 gramme per kilo, which dose in normal dogs causes an average increase of 146.9 per cent in heat production during the first hour, and 28.5 per cent during the second hour; and an average decrease of 9.3 per cent during the third hour. In the morphinized dog in Experiment 4 (Chart IX) the increase during the first hour was but 16.4 per cent, the animal being quiet and very weak, but during the second hour after cocaine the increase reached 309.5 per cent, and during the third hour 81.5 per cent. In Experiment 5 (Chart X) the increase during the first hour was 193.2 per cent, but during the second and third hours heat production fell below the normal—during the



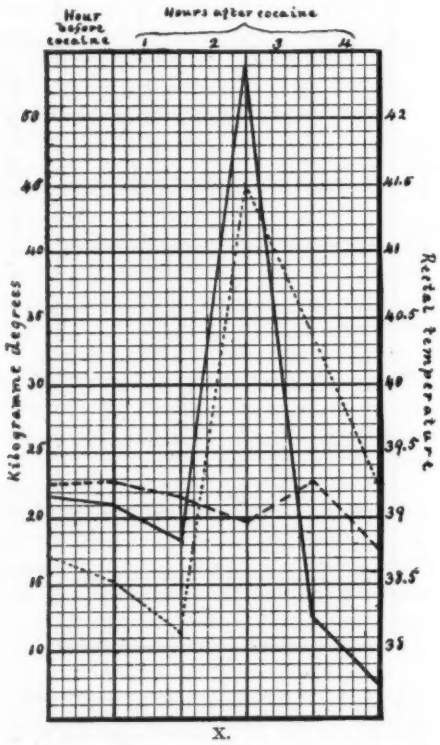
IX.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (– – – –); and the curve of temperature by a dotted line (.....).

second hour 30.4 per cent, and during the third hour 58.5 per cent. In Experiment 8 (Chart XI) the dose of cocaine was the same as in the last two, but the dose of morphine was repeated. In this experiment the increase of heat production during the first hour was 439.4 per cent, during the second hour 11.5 per cent, which was followed during the third hour by a fall of 5 per cent below the normal. In normal dogs after this dose of cocaine the mean increase in the total number of heat units was 8.58 kilogramme degrees per kilo of body weight, while in these experiments it was 11.4 kilogramme degrees per kilo, or an excess of about 33 per cent.

The temperature changes in these experiments were decided, and closely followed those of heat production. The mean maximum temperature observed in normal dogs

after the same dose of cocaine as injected in Experiments 2 and 3 was 0.54°, and was recorded during the first hour, this increase being followed by a fall. In the morphinized dogs, in Experiment 2, the temperature increased after cocaine 0.7° during the first hour, and 3.03° during the second hour, or

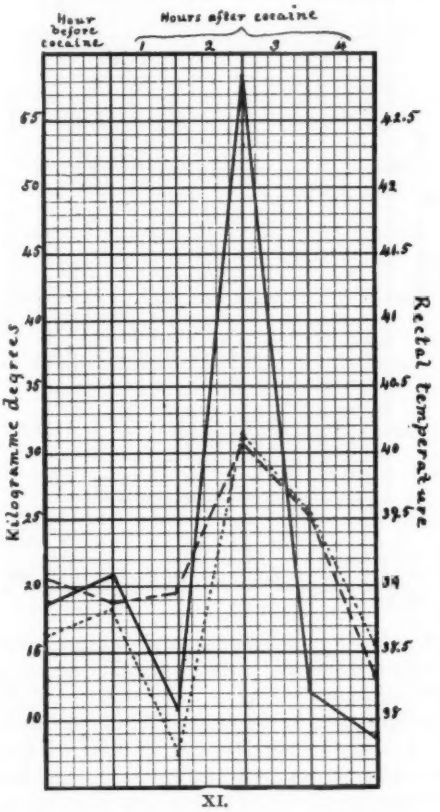


X.

The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

a total increase of 3.73°, which is 3.19° in excess of the average rise in unmorphinized dogs. In Experiment 3 the temperature increased after cocaine 0.35° during the first hour, 1.03° during the second hour, and 0.37° during the third hour, showing a total increase of 1.75°, or 1.25° in excess of the mean in dogs without morphine. The mean maximum increase in these experiments was 2.74° as compared with 0.54° in normal animals. It will be noted that in both experiments the maximum increase of temperature was recorded one and three hours later, respectively, than in normal animals.

In Experiments 4, 5, and 8, in which the dose of cocaine was 0.01 gramme per kilo, the temperature effects were far greater than in normal dogs. The mean maximal rise in normal animals was 1.81°, and was recorded during the first hour. In the morphinized dogs the maxima were recorded in one (Experiment 4) during the second hour, after cocaine, and in the other two during the first hour. In Experiment 4 the



XI.

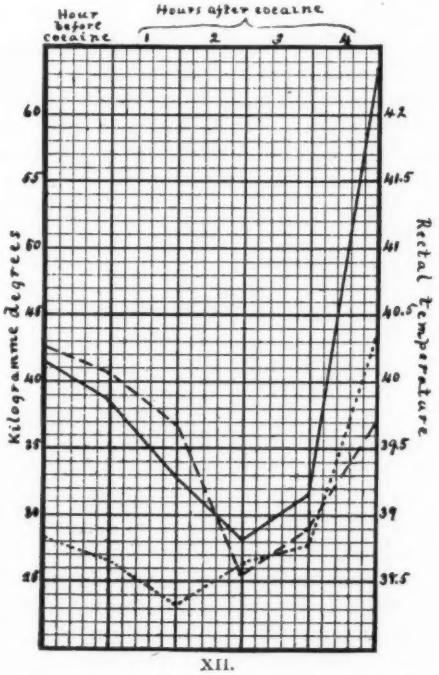
The curve of heat production (general metabolism) is represented by an unbroken line (————); the curve of heat dissipation by a broken line (— — — —); and the curve of temperature by a dotted line (.....).

maximum rise was 3.17°; in Experiment 5, 3.36°; and in Experiment 8, 3.4°—an average of 3.31° as compared with 1.81° in normal dogs.

In four of the five experiments of this group (Experiment 3 being the exception), the increase of temperature following the injection of cocaine was much greater both relatively and absolutely than in the unmorphinized dogs, and in Experiment 3 it was relatively but not absolutely greater. These results prove positively the greater power of cocaine on general metabolism and body temperature of morphinized dogs than normal dogs.

Third Group: In the two experiments

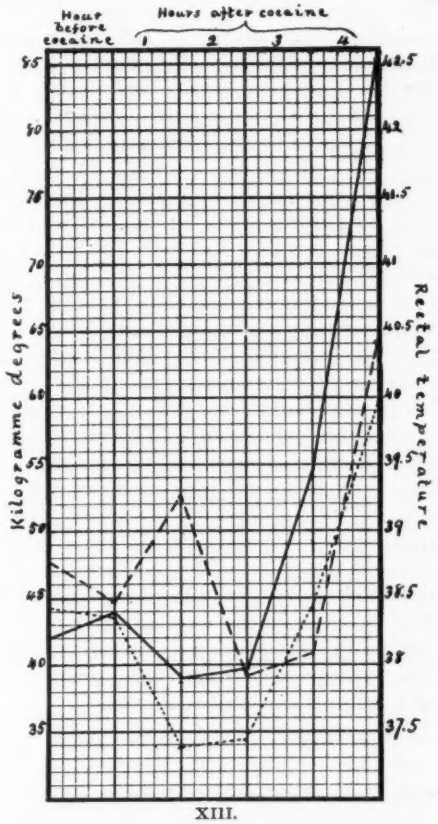
included in this group the results are of particular interest because of the delay in the appearance of the typical effects of cocaine. During the period of delayed action the animals were quiet and very weak, and exhibited no positive outward manifestation of the presence of cocaine. But with the onset of the increase of thermogenesis and body temperature they became restless, and showed other evidences of cocainism, there being associated with the apathy and great muscular weakness of morphine the psychic and motor excitement of cocaine. In these experiments the dose of cocaine was 0.02 gramme per kilo, a dose which in normal dogs causes a mean increase of 105.4 per cent in heat production during the first hour, 119.1 per cent during the second hour, and 56.3 per cent during the third hour. In Experiment 6 (Chart XII) heat production



XII.

The curve of heat production (general metabolism) is represented by an unbroken line (———); the curve of heat dissipation by a broken line (– – – –); and the curve of temperature by a dotted line (.....).

was lessened 14.2 per cent during the first hour, increased 5.7 per cent during the second hour, and increased 90.8 per cent during the third hour. It is probable that a further increase occurred subsequent to the period of the experiment. The fall of heat production during the first hour after cocaine was much less than in animals without cocaine, and shows that the cocaine acted with power in counteracting the depressant effects of the morphine, a depression sufficient to cause an average decrease of 36 per cent. In Experiment 7 (Chart XIII) heat production was increased dur-



XIII.

The curve of heat production (general metabolism) is represented by an unbroken line (———); the curve of heat dissipation by a broken line (– – – –); and the curve of temperature by a dotted line (.....).

ing all of the three hours following the injection of the cocaine—during the first hour 0.12 per cent, during the second hour 37.5 per cent, and during the third hour 116.2 per cent. It was only when psychic and motor excitement were present that the cocaine was more than able to completely overcome the morphine depression, and to increase thermogenesis to a marked extent above the normal; not that the increase was due to these solely, but to these and attendant conditions.

The temperature effects, like those upon general metabolism, compared with the records from experiments upon normal dogs

and upon the animals of Groups I and II of morphinized dogs, were not so marked during the first and second hours after cocaine, but very marked during the third hour, so that the total average rise of temperature was greater than in normal dogs, but not so great as in the other morphinized dogs. The mean increase of temperature in normal dogs by cocaine in the same dose as in the two experiments of this group was, during the first hour, 2.06°, and during the second hour 0.15°, or a total of 2.21°. In Experiment 6 the increase was during the first hour after cocaine 0.19°, during the second hour 0.15°, and during the third hour 1.64°, or a total of 1.98°. It is of interest and practical importance to note that even though heat production fell during the first hour after cocaine, and continued subnormal during the second hour, body temperature increased during both hours. In Experiment 7 the rises during the same hours were 0.04°, 1°, and 1.57°, respectively, or a total of 2.61°. The mean maximum increase in these two experiments was 2.29°, as compared with 1.98° in normal dogs. The feebleness of the actions of cocaine upon heat production in Experiments 6 and 7, compared with the effects in other morphinized dogs, may be owing to the fact that the experiments were probably terminated before the maximum effects occurred. The increase was nevertheless greater, on an average, than in normal dogs.

(To be continued.)

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*THE GENERAL MANAGEMENT AND CONSTITUTIONAL TREATMENT OF TUBERCULOSIS OF BONES AND JOINTS—SPECIAL REFERENCE TO THE USE OF TENTS.**

By H. P. H. Galloway, M.D.,

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In the treatment of tuberculous disease of bones and joints all surgeons recognize the value of functional rest, and in all standard text-books on surgery the various means of securing this by fixation, traction, local protection, etc., are more or less fully discussed; presumably careful and competent surgeons are also not neglectful of the general management and constitutional treatment of this class of cases. A somewhat careful examination of the literature of the subject, however, has caused the writer to feel that most authors make too little effort to impress upon their readers the fact that suitable environment and those general measures which are known to be of such great value in phthisis are also urgently called for when tuberculosis has attacked the bones or joints. The fourteen volumes of the Transactions of the American Orthopedic Association thus far published are replete with papers on almost every possible phase of tuberculous bone and joint disease, yet not a single paper devoted entirely to a consideration of the general management and constitutional treatment has appeared heretofore. In Volume V there is a paper by Dr. J. D. Griffith on the use of guaiacol as a constitutional remedy; in Volume XI the favorable effect of the climate of Colorado is dealt with by Dr. Geo. B. Packard; there are scattered incidental references to the value of fresh air, sunlight, etc.; but in most of the papers and discussions the general management and constitutional treatment either are not mentioned or receive but a passing notice of at most a few lines. Several excellent books on orthopedic surgery have emanated from members of this association, but in none of these, in the writer's opinion, do the chapters on tuberculous bone and joint disease deal in a sufficiently emphatic and detailed manner with the general care of the patient. In the latest edition of Bradford & Lovett's Orthopedic Surgery (1899) over one-third of the book is devoted to a consideration of tuberculous disease of bones and joints, but beyond a couple of sentences on page 44 and a single sentence on page 295, no reference is made to general management and constitutional treatment. Again, in Whitman's Orthopedic Surgery (1901) a similar proportion of the book is occupied by a discussion of the manifestations of tuberculosis that are of interest to the orthopedic surgeon, and although there are two pointed sentences on the importance of constitutional measures, one on page 58 and another on page 101, as well as incidental references in several other places, it seems to the writer that the matter receives much less attention to detail than its importance

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demands. In fact, of nearly all books on orthopedic surgery, as well as most standard works on general surgery, the criticism is not unfair, that so much attention is given to the details of local, mechanical, and operative treatment, while so much is taken for granted in regard to general management, that the reader can hardly fail to receive the impression that the latter is relatively unimportant. Of the volumes which the writer has examined, the one which appears to present most adequately the importance of looking after the patient as well as his joint is that by Nicholas Senn (Tuberculosis of Bones and Joints, 1892).

The neglect of most authors to lay greater emphasis upon the general management of patients with bone and joint tuberculosis is, it seems to me, largely responsible for the opinion held by so many general practitioners that the treatment of a case of chronic joint disease is practically summed up in the application of a suitable splint or brace. Every orthopedic specialist whose practice is largely of the referred and consultation variety needs only to look over his correspondence files and recall his consultations with general practitioners to be convinced that the one prominent question asked by the practitioner who is seeking counsel in the management of a chronic joint case is, "What kind of a splint should be used?" as if the application of some appliance constituted the Alpha and the Omega of treatment in such cases. The reason why this subject has not received more liberal attention in surgical literature is perhaps not difficult to discover. It is only a comparatively short time since the immense usefulness of mechanical apparatus in the treatment of chronic joint disease has come to be universally recognized, and our observation of the enormous superiority of the results achieved by mechanical methods over the measures formerly employed has caused us to direct all our energies to the perfecting of means for securing thorough rest and protection, with the result that the mechanical problems in connection with the joint have absorbed too large a share of our attention, and we have forgotten at times that the joint is but part of a patient. Moreover, it is but a short time since we began to realize that fresh air, sunshine, and proper food and clothing are more important than all other measures combined in the prevention and cure of pulmonary tuberculosis; while judging by our writings, and possibly to a considerable extent by our practice also, we are still largely unconscious of the fact that proper environment and the measures for general invigoration and increase of resisting power which experience has shown to be so useful when tuberculosis has attacked the lungs, are also urgently called for if we expect the best obtainable results when this disease is located in other tissues. I do not for a moment presume that the members of this association are doubtful of the benefit to be derived from good general management and constitutional treatment in tuberculous joint cases, but I question whether our theoretical views are always consistently embodied in our practice, and this paper is presented for discussion in the hope of arousing renewed attention to the subject, together with a desire to do something toward filling in what appears to me an undesirable gap in our recorded Transactions, rather than with the expectation of offering anything very new.

In the general treatment of bone and joint tuberculosis drugs occupy a small and relatively unimportant place. Tonics, such as iron and arsenic, in small doses, are sometimes of service, but most cases are as well without them if proper hygienic conditions can be secured. Cod-liver oil, during the winter months, if it be well digested, is often distinctly beneficial, especially to children, but good sweet cream is perhaps even more useful. Milk, cream, and butter of the best quality should enter largely into the dietary, along with such staples as oatmeal porridge, whole wheat bread, and beef. In general, the diet should be simple and nutritious, and it is especially necessary to intelligently adapt the patient's food supply to his digestive power and eliminative capacity. The wisdom of blindly encouraging every tubercular patient to swallow large quantities of highly nutritious foods without carefully considering his ability to assimilate them may well be doubted. Every agency should be employed which will fortify the patient's constitution, augment his general vigor, and increase the resisting power of his tissues, and it may be claimed that of all the various means to these important ends at our command the most valuable are fresh air and sunshine. The more nearly the patient can be brought to a continuous outdoor life, with the inconveniences of such a mode of living eliminated, the better. The

best means of securing this will depend upon circumstances. The ideal method is to place the patient in practically the same kind of environment as is found in the best sanatoria for pulmonary tuberculosis. In fact, sanatorium methods are almost as indispensable to the best results in bone and joint tuberculosis as in phthisis. Saying this is equivalent to claiming that the vast majority of poor patients cannot properly be treated in their own homes, and that even in the homes of the well-to-do special arrangements are necessary, and such is the case. The poor should be treated, at least for a time, in hospitals—not in ordinary hospital wards, but in hospitals with special provision for the requirements of tuberculous patients in regard to sunshine and fresh air. I know of few more discouraging problems than the attempt to treat successfully and guard against relapse the immense number of tubercular joint cases seen in the orthopedic clinics of the hospitals in large cities. The depression of vital powers which results from insufficient and unsuitable food is accentuated by breathing the vitiated atmosphere of small, close, dirty rooms, and is multiplied almost indefinitely by the general ignorance, wretchedness, poverty, vice, and bad heredity of the submerged classes in our large centers of population. The only hope of giving such patients a fair chance in the conflict with such a foe as tuberculosis consists in securing for them, for a time at least, proper hygienic surroundings, and this for the purpose of enlightening them as to their own requirements not less than for the immediate beneficial effect of the improved environment. The writer is not blind to the practical difficulties in the way of providing suitable hospital accommodation during lengthened periods for the multitude of patients with chronic tubercular joint affections; nevertheless, it is the duty of the medical profession to arouse attention to the existing need, and to point out that civilization and philanthropy have thus far failed adequately to provide for it. The requirements will not have been met until the poor who suffer from these affections can command the advantages of sanatorium methods, at least during the acute stage of the disease and in the winter season. In the convalescent period and during summer they can be treated fairly well as out-patients, for a great many cases, even among the poor, do reasonably well in the warm season when for their own comfort they are compelled to open up their houses, live out-of-doors to some extent, and get all the fresh air possible. My observations have convinced me, however, that relapse and aggravation of Pott's disease, hip-joint disease, and other chronic tubercular joint troubles are especially apt to occur during the latter part of the winter, the reason being that the patient's general health and resisting power have been greatly reduced by months of residence in close, ill-ventilated rooms. In the case of the very poor the only sure way of preventing this deterioration of general health and its resulting unfavorable influence upon the joint affection is to provide for them a suitable environment during the inclement season.

The plan of treating pulmonary tuberculosis in tents is one which has gained greatly in favor during the past few years, as it has proved a simple, practical, inexpensive, and efficient method of enabling patients to live all the time practically in the open air. The ventilation in a tent may be made nearly perfect; for although special, controllable, ventilating openings should be arranged, one has but to examine a piece of canvas under a microscope to be convinced that an immense volume of air must diffuse itself through the natural open windows of this fabric, especially during cold weather, when the tent is heated and a difference in temperature between the inside and outside air thus created. That such rapid diffusion actually takes place is proved by the freedom from foulness of the atmosphere in the tent even when patients are crowded together in a way that could not safely be permitted in an ordinary hospital ward, and by the relatively large amount of fuel required to heat the tents. This fact, that the colder the weather the better is the ventilation, makes the tent especially valuable during winter when the patients are more inclined to shut themselves up. During summer, of course, the sides of the tent are raised and the patients are then practically in the open.

Over a year ago some experiments in treating in tents patients suffering from tubercular bone and joint disease were begun in the Toronto Orthopedic Hospital. In fourteen months (March 15, 1901, to May 15, 1902) there were admitted to the tents the following cases: Pott's disease, 25; hip-joint disease, 13; white swelling of knee, 6; white swelling of ankle, 4; white swelling of

elbow, 1; in all 49 different cases. The shortest period spent in the tent by any patient was one day, the longest 343 days.

The entire number treated has been too small, and the period over which the observations extended too short, to permit of any exact scientific deductions; moreover, the method of keeping records has hardly been sufficiently uniform and exact to make any compilation of statistics possible. Consequently the writer's object is simply to record a few general observations. In a general way, then, it may be stated that from observing these cases and contrasting their behavior after they entered the tents with their previous progress under ordinary conditions, the conclusion arrived at has been emphatically and even enthusiastically favorable to tent life. The response to the change is usually immediate and pronounced. In most cases a distinct improvement in appetite is observed within twenty-four hours; both nurses and kitchen staff report that relatively a larger proportion of food is consumed, and it is eaten with greater relish by the tent patients than by those in other wards. I have repeatedly been struck by a distinctly favorable change in the color and expression of the face within one or two days after admission to the tents, the dull, listless, sickly, anemic appearance having within that brief time undergone a change which could not fail to attract attention. The patients almost immediately begin to put on flesh, while mental depression vanishes, and a buoyant, happy, hopeful feeling takes its place. The general impression left upon the surgeon's mind as he observes the patients day after day is that they are doing well, that their general health is being rapidly improved, their physical capital augmented, and their resisting power reënforced. Improvement in the local conditions is usually quite as satisfactory, but is slower in manifesting itself, and appears to be consequential upon the improved general condition. The conclusion is irresistible that most of the patients have made much more rapid strides toward recovery than would have been possible under ordinary conditions. It is interesting to note that the friends of patients under treatment in the tents are usually greatly delighted with the improvement they observe, and in some instances parents are very anxious to secure the readmission of children whom they had removed. Another fact worthy of being referred to is that the general health of the nurses who are on duty in the tents undergoes a distinctly favorable change. They report increase of appetite, and that they feel stronger and more vigorous; and it is quite certain that their gain in flesh and improvement in color could hardly fail to attract the attention of even a careless observer. So conscious are the nurses of the difference that they invariably regret when their turn comes to return to duty in the regular wards.

While outdoor life is of great assistance in the treatment of all tubercular bone and joint affections, it is particularly useful in that class of patients whose recuperative power appears to have been exhausted, and who are being slowly worn out by discharging sinuses which other means of treatment have failed to heal. We are all only too familiar with these unpleasant cases, in behalf of which we have put forth our best efforts, but in which surgical and mechanical methods alike have failed or been but partially successful, and in which the tubercular process creeps on from one portion of tissue to another, or has become so deep-seated in the pelvis or spine that it is practically beyond reach of direct treatment. In some such cases our only resource lies in efforts to improve the general resisting power of the patient; if this can be done he has a chance of escaping from the malady which holds him so relentlessly. It is not an exaggeration to claim that the lives of some such patients may be saved through the agency of fresh air and sunshine after all other means have failed. It is not claimed that tents offer the best solution of the problem of securing the nearest approach to a continuous outdoor life, but that properly designed tents suitably located are much better than the average hospital ward, and that they are an efficient and inexpensive supplement to the regular wards. The kind of buildings and much of the routine of life adopted in modern sanatoria for pulmonary tuberculosis are probably just as useful and efficient as tent life, and are certainly more convenient, and such buildings and a similar routine should be employed by all hospitals which aim at affording everything necessary for the best care of patients with surgical tuberculosis. In the case of private patients, various expedients may be resorted to to secure the benefit of sunshine and fresh air, when for any reason residence in a sana-

torium is impracticable or undesirable. Many patients who have a lawn in connection with their homes can be induced to fit up a private tent and occupy it even during the winter months. Others who have a veranda with a southern exposure can be taught to make good use of it, and soon learn to enjoy spending much of the time in the open air even in cold weather, their body clothing and bed covering being, of course, adapted to the season. Even in ordinary private houses the ventilating arrangements of living and sleeping rooms often can be enormously improved by the exercise of a little ingenuity, and the surgeon should give these arrangements personal supervision.

No reference thus far has been made in this paper to the necessity of using such special orthopedic treatment as each case may call for. It is admitted by all that a certain proportion of tubercular bone and joint cases will ultimately terminate favorably as far as arrest of the morbid local process is concerned, under purely expectant measures. We all know, however, that this spontaneous recovery is usually accompanied by unnecessary and often pitiable deformity, and we are quite as certain that not only can deformity be largely prevented, but that the disease can be brought to a termination in a shorter time, with less destruction of tissue, and at the expense of far less suffering, by the intelligent use of surgical and mechanical means. It is important not to misunderstand the true relation of constitutional measures to surgical and mechanical treatment. The mistake is often made of supposing that a patient is necessarily deprived of the benefit of exercise and fresh air while confined to bed. Many orthopedic cases are best managed throughout the acute stage in the recumbent position, fixation dressings, extension, etc., being used according to indications; but it is most important to see that this period of enforced inactivity is passed in a suitable environment, and that the lack of active exercise is compensated for as largely as possible by systematic, efficient massage. On the other hand, it is necessary to guard carefully against the error of looking upon fresh air and sunshine as substitutes for surgical and mechanical means. Their true office is complemental, not vicarious. Our efforts to perfect mechanical and local methods of treatment must not be relaxed, but we should strive more earnestly to secure such fortification of the patient against relapse or other manifestations of vulnerability as is afforded by hygienic living and improved environment.

When we recall the deplorably large number of relapses after apparent cure, and the great proportion of our cured patients who afterwards die of some other form of tuberculosis, it becomes a practical and serious question whether we are not largely responsible for these unfortunate sequels by our failure to make greater efforts to regulate permanently the habits and environment of our patients.

In conclusion, let me say that when an individual with tubercular disease of hip, spine, knee, ankle, etc., presents himself for advice, *the surgeon's first duty is to realize that he is being consulted by a patient who has tuberculosis;* and just in proportion to the clearness with which this idea is defined in his own mind will the surgeon be able to take a comprehensive grasp of the present and future needs of his patient. Painstaking efforts to teach the patient, or in the case of a child those responsible for him, as much as they are capable of understanding about the nature of this disease will be well rewarded. The patient's hearty coöperation, which is so indispensable, is likely to be secured only in proportion as the surgeon succeeds in making him grasp what tuberculosis means and what its existence in his system implies.

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*INTERNAL DERANGEMENT OF THE KNEE-JOINT.**

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Internal derangement of the knee-joint is a phrase applied to a certain set of symptoms which are usually pretty definite. These symptoms are caused by a displacement of the semilunar cartilages. This may be very slight, with an immediate return to its normal position, or it may have all grades of severity up to complete dislocation, with a firm locking of the joint in consequence. The accident may take place after some simple motion, as getting up out

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of a chair, or suddenly getting up from a stooping position, or after some severer accident, as being thrown from a bicycle or being suddenly thrown against some hard object; or the reverse, as having some object thrown forcibly against the knee-joint. The simpler forms of this trouble give rise to the milder symptoms, but even these cases are very apt to need treatment before the knee symptoms disappear.

With lax ligaments there may also take place a nipping of the folds or shreds of the synovial membranes between the ends of the bones. A piece of fringe may become entirely separated, and floating about cause a locking of the joint.

The symptoms of internal derangement are pretty typical. The trouble usually dates from some accident or from some slight wrench or twisting of the joint, after which the knee is weak. If the accident has been a slight one, effusion is not so apt to occur, although usually it is present; but the joint is weak, giving way at intervals, and causing the patient to fall, followed a little later by the actual locking of the joint. The knee becomes locked in a slightly flexed position, is painful, tender, particularly on the inner side of the patella, and it is impossible to completely extend or straighten it. At the time of the accident there may or may not have appeared a bunch on the inner side of the joint with a story of its having slipped back. Any attempt at manipulation causes intense pain. After the subsidence of the acute symptoms, either with or without treatment, the patient gets about again, but the knee is troublesome. In the more marked cases it cannot be completely extended, and consequently there is a limp in walking. The giving way or the locking takes place at intervals, and each one leaves the knee somewhat more tender, until finally the patient becomes practically a cripple.

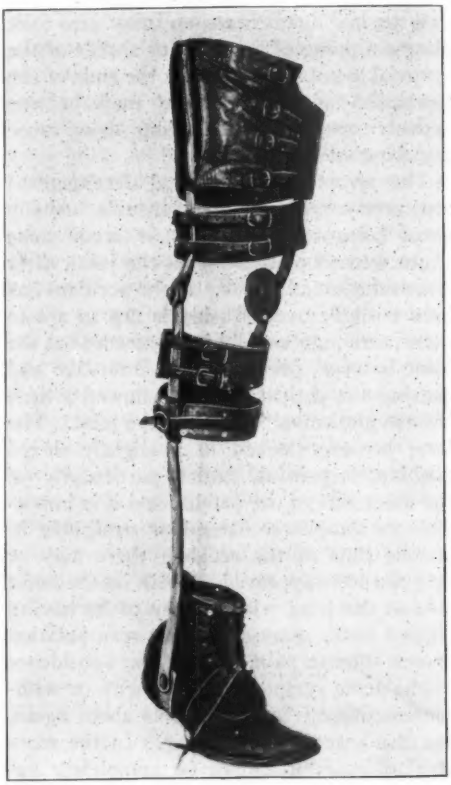
There is another class of cases which should be mentioned where the trouble comes on gradually without the patient being able to recall any particular wrench or accident as a cause. In examining these cases carefully I have found a laxness of the ligaments in the other knee and in the other joints, so that the gradual onset is easily explained. Such a case was that of an old lady, sixty-eight years of age, who consulted me last Fall. She complained of both knees "cramping," as she expressed it; then something would slip, the cramp would disappear, the knee would straighten, and everything would be all right again. Examination showed a general laxness of all ligaments, and undoubtedly here was a typical case of internal derangement or slipped semilunar in both knees, of gradual onset, without the history of any kind of accident.

The physical signs of this condition are also very marked. The first thing noticed is the lateral mobility of the joint, and in some cases the amount of motion possible is surprising. The ligamentum patellæ is elongated on the affected side in many cases. There is inability to completely extend the leg. This is not only due to the lengthened ligamentum patellæ when present, but more especially to the bruised and swollen edge of the semilunar cartilage. The flexion is not due to a foreign body between the ends of the bones, because under ether it cannot be reduced, and under treatment it gives way slowly and gradually, corresponding exactly to the subsidence of the inflamed and swollen cartilage. It is usually the internal cartilage that slips out, and consequently there is almost invariably a point of tenderness on pressure on the inner side of the patella. The thigh muscles are usually atrophied.

A brief review of the anatomy and the mechanics of the knee-joint makes clear the train of symptoms and the effectiveness of the mechanical treatment of the difficulty. The anatomical parts which become of particular interest are the internal lateral ligaments, the crucial ligaments, the ligamentum patellæ, and the semilunar cartilages, especially the internal semilunar. When the leg is completely extended the lateral ligaments hold the joint firmly and prevent any lateral motion. The rectus muscle, acting through the quadriceps extensor tendon, the patella, and the ligamentum patellæ, holds the joint firm and rigid from the front. In partial flexion the same structures also hold the joint firmly, and in complete flexion the crucial ligaments are made tense and thus prevent some motion laterally. All these ligaments hold the knee firmly under ordinary conditions, but when the knee is flexed a certain amount of laxness takes place in the lateral ligaments, and any motion which causes even a slight twisting (rotation) of the tibia would allow some slight separation of the joint surfaces on the inner side, and might cause the semi-

lunar cartilage to be pushed forward and inward. Then would come the sudden pain and the sensation of something bulging on the anterior and inner side of the knee. The posterior portion of the ligament may thus get caught between the femur and the tibia behind, and thus the joint may become locked so that motion is impossible either way until the cartilage suddenly slips back into place, when motion is at once restored.

The treatment of this condition if seen immediately after the accident is rest in bed with the application of some stimulating liniment, such as soap liniment, followed by massage. If the joint is extremely tender so that any motion causes pain, then fixation is necessary, and preferably by means of plaster of Paris. In young people, at a first accident which is not very severe and the effusion only slight if any, the stimulating liniment and massage may be entirely sufficient, but if a second accident occur, then apparatus should be applied without delay and continued until the cure is complete. In adults these accidents, if not very severe, are apt to cause more disturbance than in the younger people (under twenty perhaps), and when seen immediately after the injury are much more apt to need bed treatment and fixation. The nature of the injury also has a great deal to do with the severity of the symptoms. For instance, a railroad injury would usually cause more trouble than a slight twisting when getting up out of a chair. In the great majority of cases the knee is not seen until the patient has been troubled for some time, consequently the treatment must be entirely different. In these patients, and in the ones seen early, after the preliminary treatment is ended and the knee still remains troublesome, the slipping out of the semilunar cartilage must be prevented. This can be accomplished by a mechanism which causes a lateral pressure to be applied upon the inner condyle, thus preventing any separation of the condyles. By grasping the thigh firmly, and being attached to the bottom of the shoe, it prevents the rotation or twisting motion of the tibia which is such a common cause of the accident. There is also a stop joint at the knee which prevents it from going back far enough in walking to put any strain on the posterior ligaments of the joint. If these three things are accomplished the pain disappears, and the accident becomes an impossibility while the apparatus is kept properly adjusted. Such an apparatus has been described by Dr. Shaffer; it is that apparatus which I have made use of, and the results have been so surprisingly and uniformly excellent that I wish to report a number of cases.



Splint showing the principles of the Shaffer apparatus for internal derangement of the knee-joint.

CASE I.—A young girl of sixteen twisted the right knee in dancing. Something was felt to slip on the inner side of the patella, and the knee at once became tender and painful on motion, and a slight amount of swelling was present. The patient living in the country made use of home remedies and remained off her feet. One week later she reported at my office for advice. At this time there was tenderness on pressure at the classical point, and no effusion was present. There was some pain and a slight limp on walking. Soap liniment and massage were advised, and in a week the knee was well, and there has been no

return of the symptoms now nearly a year after the accident.

This case fairly represents a type seen in young persons, the most of them doing well with the simple treatment described.

CASE II.—A girl of about twenty years of age had complained for about one year of the left knee "slipping," as she expressed it, and feeling as if it was going to give way under her. It was getting more and more troublesome, so that she sought advice in May, 1900. There was no history of injury, but the onset was gradual. There was no elongation of ligamentum patellæ, and no atrophy of thigh muscles. There was present lateral mobility of the joint; the knee creaked on motion, and some of the other joints were also creaky. A regular Shaffer apparatus was applied, which gave immediate relief to her symptoms. This apparatus was worn for a little over a year, when it was omitted, and the knee has remained in excellent condition ever since.

CASE III.—A girl of seventeen sought advice in April, 1900. Three years previously she had fallen from the bed to the floor, in her sleep, injuring the left knee. She was laid up for a few days only. Two years later she had fallen from her wheel and injured the same knee. From the first accident the knee had caused some trouble, but since the second the symptoms had become aggravated, so that often there was a sudden giving way, when she was liable to fall. On one occasion she fell to the floor while dancing, and advice was sought for fear of actual injury in some of these falls. The patient was a large, fleshy girl. There was no elongation of the ligamentum patellæ, but there was increased lateral mobility of the left knee. There was no atrophy of the thigh, and there had been no locking of the joint, but before the apparatus was completed this locking took place while in bed, so that for a few minutes she could not move the knee either way. The apparatus was finally applied in June, 1900. There was complete relief of symptoms, and in the summer of 1900 the patient went abroad and did a great deal of walking with entire comfort and freedom from accident. One year later, while playing basket ball without the apparatus, she sustained a very bad sprain of this knee-joint, on account of which the apparatus was worn for three months longer, and then omitted for good. There has been no return of symptoms.

These last two cases also represent a type. Here the important symptom was the giving way of the knee and no locking of the joint. The last case confirmed the diagnosis by the locking of the joint before the apparatus was applied.

CASE IV.—A young man of twenty-one years, a hostler, was in a box car with a horse. This car was switched on to the main train with so much force that he was thrown down and the horse on top of him, striking and severely wrenching his right knee. The knee was locked so that it could not be moved either way (flex or extension) until the following day. It was very painful, and a bunch could be felt on the inside of the joint. I first saw the case on the third day following the accident. The knee was flexed at an angle of 165° with the thigh. Beyond this point it could not be extended. A slight amount of motion in flexion was possible but painful. There was much tenderness about the inner condyle and along the inner border of the ligamentum patellæ. The circumference of the right knee was three-fourths inch greater than its mate. The treatment was rest in bed and acetate of aluminum externally. The knee improved, but inability to extend beyond an angle of 165° continued, consequently the usual apparatus was applied in the third week following the accident. The stop joint at the knee was arranged to stop at about 165°. In a week the pain had completely disappeared, and in one month complete flexion was possible with the apparatus on, and early in the third month complete extension was possible for the first time. This young man omitted his apparatus contrary to advice, after wearing it about six months. It is now about 1¾ years since the accident, and there has been no return of symptoms.

CASE V.—A rather fleshy woman fell from her wheel in September, 1898. She was unconscious for a while, and could not tell exactly how she struck, but the right knee was very much swollen, red, and tender. The treatment at the time was a splint for ten days, when she got up and began to hobble about, and slowly improved in ability to walk. She was unable to flex the joint very much on account of pain. The

knee during all this time would give way, and she was in constant danger of falling. The inner side of the knee has always remained tender. This patient consulted me three months after the accident, at which time there was considerable lateral mobility and very marked tenderness to pressure all about the inner condyle. The leg could with some difficulty be completely extended. The circumferences of the right leg were all less than the left. Calf, right 16¾, left 17¼; knee over patella, right 18, left 18½; thigh, right, 21¾, left 22½. The usual apparatus was finally applied about the middle of January, 1900. In a week the pain had disappeared from the knee and she could walk very comfortably. Improvement continued steadily, and during the summer of 1900 she spent six weeks or more in the mountains walking about everywhere with entire freedom from symptoms. In December, 1900, after wearing the apparatus a little less than a year, it was omitted, and there has been no return of the trouble.

It seems sometimes almost wonderful to see patients practically crippled and unable to get about to do their customary work, when after having the apparatus adjusted they are immediately able to get up and walk and go about their duties. I shall briefly mention three such cases.

Case VI.—A woman about forty years of age gave a history of both knees giving way under her, but the left one had not troubled her in about ten years, while the right one had become locked eight weeks before consulting me. This happened while the patient was asleep in bed, so that when she waked in the morning it could not be moved. The treatment had been a posterior splint. The patient was unable to walk at all, and was brought to my office in a carriage. During the next two weeks, while apparatus was being made, the splint was omitted and very moderate use of the knee allowed. When the apparatus was applied a friend with whom she was visiting was taken sick, and this patient was actively engaged in caring for her, going up and down stairs with perfect ease. The relief was immediate.

Case VII.—A woman fifty-five years of age had been very much crippled for a year with an internal derangement of the left knee-joint. The knee was flexed, and as she was very fleshy it was with difficulty she could hobble around. The usual apparatus was applied, and immediately walking was made comfortable, and in one month the knee could be completely extended.

Case VIII.—A man about thirty-five years of age, while wrestling, twisted the leg in such a manner that the cartilage was displaced, and he had been unable to work for six weeks. Immediately the apparatus was applied he returned to work.

These three cases simply show how *immediate* is the relief when proper mechanical treatment is applied.

One case to show that even when the trouble has existed for a long time, it is still advisable to apply mechanical treatment.

Case IX.—A man thirty-nine years of age. The first accident was in 1884, with recovery. The second was in 1886, and it had been more or less troublesome ever since, until finally he had to walk with a cane all the time and use the greatest care in getting on and off the electric cars. The knee was flexed at an angle of 165° with the thigh. Atrophy was present, and there was marked tenderness about the inner condyle. Apparatus was applied in September, 1900, and he has been comfortable ever since. I carefully examined the knee last Spring, and it seemed to be perfectly well. He has been urged to omit the apparatus, but is so afraid that something will happen that he still continues to wear it.

Case X.—A woman thirty-eight years of age. In this case the patient does not remember any particular accident, but says the trouble came on suddenly two years before consulting me. The knee became locked four times in two years, and the last time it remained locked for thirty-one hours. There was no atrophy, and the leg could be completely extended. There was a slight amount of lateral mobility. This case looked suspiciously like floating cartilage, but the usual apparatus was applied in November, 1901, and thus far no accident has occurred.

In my experience the "giving way" of the joint is the most common symptom, and at first I was in doubt as to its going on to a locking of the joint, but subsequent observations have shown that this happens almost invariably if allowed to go untreated. The results of mechanical treatment have

been such as to lead me to think that operative treatment would be necessary only in cases of floating cartilage or a long piece of fringe, which would practically amount to the same thing.

NOTES ON THE TREATMENT OF URETHRITIS.

By E. H. Siter, M.D.,

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While looking over the case-books of the genito-urinary dispensary of the University Hospital, Philadelphia, it occurred to me that a few of the prescriptions found of value there might prove of service to medical men who probably have no access to records of a service extending over the last twenty years.

The case-books at hand date from the year 1880, and in this period nearly every drug in the United States Pharmacopœia has been tried, and many of them found wanting. In quoting the case-books I shall only give the prescriptions found to be of value, more or less. It is impossible, of course, to use them indiscriminately, but they may suggest a line of treatment to the general medical man.

The treatment of gonorrhea, like everything else in modern medicine, is changing constantly, but there are a few old standbys to which, try as we will for better things, we find it advisable to return—for example, the permanganate of potash, which is almost as old as the disease itself, the sulphate and chloride of zinc, the acetate of lead, and tannic acid. So much for the local treatment. The internal medication has changed little; the administration of alkalines, sedatives, and diuretics has been in vogue for years, the use of copaiba and santal oil, in combinations, perhaps not for so long a time. The case-books I have had access to are rich mines of genito-urinary information. When it is considered that they have been most minutely kept, and also when we look back and think of the men who have contributed to them for so many years, it seems like a continued story of the progress of treatment of genito-urinary and venereal diseases.

In beginning I shall give the prescriptions used locally for acute anterior urethritis, to be injected, of course, with a hand syringe.

℞ Acid. boric., 3j;
Morph. sulph., gr. j;
Aquæ destil., f℥iv.
S.: Use as injection three times daily.

℞ Acid. boric., 3j;
Tr. opii, f3j;
Aquæ destil., q. s. ad f℥iv.
S.: As an injection three times daily.

℞ Plumb. acetat., 3j;
Tr. opii, f3j;
Aquæ destil., q. s. ad f℥iv.
S.: Use as injection three times daily.

℞ Argent. nitrat., gr. 1-2;
Aquæ destil., f℥iv.
S.: As injection three times daily.

℞ Extract. ergot. fl., f3ij;
Aquæ destil., q. s. f℥iv.
S.: As injection three times daily.

℞ Ichthyol., gr. xx;
Aquæ destil., f℥iv.
S.: As injection three times daily.

℞ Zinc. sulph., gr. viij;
Liquor. hydrast. (colorless), f℥ss;
Aquæ destil., q. s. f℥iv.
S.: Thrice daily.

℞ Bismuth. subcarb., gr. xx;
Liquor. hydrast. (colorless), f℥ss;
Aquæ destil., q. s. f℥iv.
S.: As an injection three times daily.

℞ Hydrarg. chlorid. corros., gr. 1-4;
Zinc. sulph., gr. x;
Acid. boric., 3j;
Tr. opii, f3iij;
Aquæ destil., q. s. f℥vj.
S.: Use thrice daily.

℞ Zinc. sulph., gr. viij;
Plumbi acetat., gr. xij;
Tr. opii.,
Tr. catechu, ää f3ij;
Aquæ destil., q. s. ad f℥iv.
S.: Inject five times daily.

℞ Zinc. sulph., gr. viij;
Extract. opii, gr. xx;
Glycerin., f3iij;
Aquæ destil., q. s. ad f℥vj.
S.: Use four times daily.

℞ Zinc. acetat., gr. ij;
Acid. boric., gr. xlviij;
Extract. opii, gr. xx;
Glycerin., f℥ss;
Aquæ destil., q. s. ad f℥viij.
S.: Use four times daily.

℞ Bismuth. subcarbonat., 3ij;
Glycerin., f3ij;
Aquæ destil., q. s. ad f℥iv.
S.: Inject four times daily.

℞ Extract. opii, gr. xx;
Liquor. plumb. subacetat. dil., f℥iv.
S.: Inject four times daily.

℞ Zinc. sulphocarbolat., gr. xij;
Aquæ destil., f℥iv.
S.: Use four times daily.

℞ Bismuth. subcar., ℥ij;
Tr. opii, ℥ij;
Glycerin., f℥ss;
Aquæ destil., q. s. ad f℥iv.
S.: Use four times daily.

The foregoing prescriptions are not written in their order of merit, but simply as they were taken from the book. In conjunction with these, it is well to use any one of the following for internal medication, suiting, of course, the prescription to the case:

℞ Potass. bromid.,
Pulv. cubeb., āā ℥ss;
Disp. in chart. No. x. S.: One powder every three hours.

℞ Tr. aconit. rad., gtt. viij;
Sodii bicarb.,
Potass. bromid., āā ℥ij;
Liquor. potass. citrat., f℥viij.
S.: f℥ss in water every two hours.

℞ Balsam. copaib.,
Extract. ergot fl., āā f℥ss.
Mucilag. acaciæ,
Aquæ destil., āā f℥ijss.
S.: f℥ij in water every four hours.

℞ Potass. bromid., ℥vj;
Liquor. potass. citrat., f℥viij.
S.: f℥ss every four hours.

℞ Sodii bicarb.,
Potass. bromid., āā ℥j;
Tr. belladonnæ, f℥iij;
Liquor. potass. citrat., f℥viij.
S.: f℥ij every four hours.

℞ Pulv. cubeb.,
Potass. bromid., āā ℥ij.
S.: ℥j in water four times daily.

In the treatment of chronic anterior urethritis the following have been used with excellent results:

℞ Zinc. sulphat.,
Plumbi acetat., āā gr. viij;
Aquæ destil., f℥iv.
S.: Used thrice daily.

℞ Cupri sulphat., gr. iv;
Aquæ destil., f℥iv.
S.: Inject night and morning.

℞ Zinc. sulphat., gr. xviij;
Acid. hydrocyanic. dil., gtt. xviij;
Aquæ destil., f℥vj.
S.: Three times daily.

℞ Zinc. sulphat., gr. vj;
Extract. belladon., gr. viij;
Glycerin., f℥ss;
Aquæ destil., q. s. ad f℥iv.
S.: Twice daily.

℞ Zinc. sulphat., gr. x;
Aquæ destil., f℥viij.
S.: Thrice daily.

℞ Zinc. sulphat.,
Acid. tannic., āā gr. xx;
Acid. boric., ℥ss;
Aquæ destil., f℥iv.
S.: Twice daily.

The treatment that is at present used, sometimes varied with some of the foregoing, is as follows: for the early acute stage, an irrigation of the anterior urethra with

℞ Potass. permanganat., gr. j;
Aquæ destil., f℥viij.

The irrigation is followed by the introduction, with a hand syringe, of one-half-per-cent solution of protargol. This solution is retained in the urethra for from five to ten minutes. These maneuvers are repeated three times a day. With this there is given by the mouth one of the following:

℞ Sodii bicarb.,
Potass. bicarb., āā 3j;
Potass. bromid., ℥ij.
Disp. in chart. No. 10. S.: One every two hours.

℞ Pulv. acid. boric.,
Potass. bromid.,
Salol., āā 3j.
Disp. in chart. No. 12. S.: One every hour.

As the discharge somewhat diminishes, one of the following is usually given as a hand injection:

℞ Acid. carbolic., gtt. iv;
Zinc. sulphat.,
Pulv. alum, āā gr. xij;
Aquæ destil., f℥iv.
S.: Used as injection three times daily.

℞ Zinc. sulphat., gr. x;
Liquor. hydrast. (colorless), f℥ss;
Plumb. acetat., gr. xij;
Aquæ destil., q. s. ad f℥vj.
S.: Use three times daily.

In conjunction with these it is customary to give, three times a day after meals, two capsules, each containing the following:

℞ Balsam. copaib.,
Ol. santali, āā gtt. v.

For the declining stage, the following is used:

℞ Zinc. acetat.,
Acid. tannic., āā gr. xij;
Aquæ destil., f℥iv.
S.: Use once at bedtime.

℞ Zinc. chlorid., gr. iv;
Aquæ destil., f℥iv.
S.: Inject twice daily.

The use of silver salts seems to be limited to the acute stage, as it has been found that

they will reduce the discharge to a certain point, where their usefulness appears to cease, and it becomes necessary to use more active and less irritating astringents.

For the treatment of acute posterior urethritis, total irrigation with a solution of permanganate of potash is employed with a meatus nozzle, using a fountain syringe at a height of about six feet. Beginning is made with one-to-eight-thousand, increasing the strength to one-to-four-thousand. The patient is warned of the possibility of an attack of epididymitis. At the same time, capsules of copaiba and sandalwood, the formula for which is given above, are administered by the mouth. The irrigations should be repeated daily until the symptoms subside and the urine clears up.

The treatment for chronic posterior urethritis is irrigation as above, substituting for the permanganate of potash, however, a solution of nitrate of silver one-to-eight-thousand, increasing the strength to one-to-four-thousand. (These irrigations are usually continued until a pint of the solution has been introduced into the bladder; if the patient feels much discomfort on account of the small capacity of his bladder they can be discontinued before that quantity has been introduced.)

Another treatment for chronic posterior urethritis is the use of the deep urethral instillator, when any one of the following solutions may be used: Sulphate of copper, two-per-cent solution; chloride of zinc, two-per-cent; nitrate of silver, one- or two-per-cent.

I do not claim originality for any of these treatments. My aim in presenting them in this fashion is to make them easy of reference for men who do not wish to wade through books on the subject.

THE TREATMENT OF URGENT UTERINE HEMORRHAGE IN NON-PUERPERAL WOMEN.

BUBAR and POTEL, in the *Journal de Médecine de Paris* of April 6, 1902, point out that there are two methods of treating such a case, namely, by irrigation with very hot water and tamponing the vagina. For the carrying out of irrigations with very hot water the patient must lie in the horizontal position on a bed or couch, and a large quantity of very hot water—that is to say, six, eight, or ten quarts as hot as the patient can stand it—be passed through the uterine cavity. This must be done twice or thrice a day. The irrigations aid in causing contraction of the walls of the minute blood-vessels. For tamponing the vagina, a vaginal speculum is required with a pair of long applicators to insert the tampons. These tampons should not be allowed to remain in place for a longer period than twelve hours, and the greatest possible care should be exercised that they are thoroughly aseptic.

A third method which has sometimes been employed for the controlling of such hemorrhages is the application of ice or very cold water to the external abdominal wall, which reflexly influences the pelvic circulation. Sometimes the irrigation of the vagina alone with hot water will cause sufficient contraction without irrigating the uterus, and according to these authors antipyrin may be employed for its styptic effect. Or the cervix may be dilated and intra-uterine tampons inserted under careful antiseptic precautions; this tampon being wet with antipyrin in the proportion of one drachm to the ounce of sterile water.

AFTER ABDOMINAL SECTION. THE USE AND ABUSE OF MORPHINE

DUNNING summarizes his views as to this question in the *Journal of the American Medical Association* of April 12, 1902, in the following words:

1. The routine use of morphine and other preparations of opium is to be condemned.

2. For the relief of severe pain and marked restlessness morphine is much superior to codeine, though more prone to be followed by unpleasant symptoms, such as nausea, vomiting, diminished secretions, and constipation of the bowels.

3. The serious after-effects of morphine may be largely overcome by the drinking of liberal quantities of water before the operation, and the rectal injection of a pint or quart of the normal salt solution immediately after the operation, the systematic use of the colon tube, and the early action of the bowels.

4. In persistent vomiting not due to sepsis or peritonitis, small doses of morphine hypodermically not infrequently affords relief.

5. In secondary shock due to fright or overanxiety morphine in small doses is often a potent remedy.

The Therapeutic Gazette

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Leading Articles.

THE THERAPEUTICS OF THE SUPRARENAL GLAND.

In this issue of the THERAPEUTIC GAZETTE we publish a series of interesting papers upon the suprarenal gland with special reference to its therapeutic employment, and we are glad to be able to present to our readers the opinions of men who are not only prominent in the profession, but whose opportunities for deciding upon the value of this new remedy are such as to provide a large personal experience. It may seem to some of our readers after perusing these articles that doubt has been thrown upon the real therapeutic value of derivatives from the suprarenal body; but, in reality, we believe that a careful perusal of these papers will engender a very different decision. It will be noticed that in certain conditions unqualified praise is given to this substance for its therapeutic activity, and that in other instances it is not so highly praised, and in a few instances unqualifiedly condemned. To the mind of the writer such modified praise shows not only that the writers of these papers are competent critics who are not led astray in their judgment by undue enthusiasm, but also indicates that the drug is surely possessed of valuable properties which in future must continue to be of immense service in medicine. It is absurd to suppose that a remedy can be employed in widely different conditions and always produce identical results. It is still more absurd to suppose that it may be employed haphazard, when we really have little knowledge as to its limitations, without at times causing effects which may be considered disadvantageous. Any drug which possesses power for good will, if improperly administered, produce evil results, and it is only a substance which is practically impotent which never has any evil influence ascribed to it.

As a matter of fact, it is extraordinary that a remedy possessed of such powerful physiological properties could have been used so widely and so carelessly and yet have caused so few symptoms which have been considered in any way alarming. Doubtless increasing experience will not only point out the limitations of its therapeutic usefulness, but will also emphasize the fact that much of its influence depends upon the manner in which it is administered. It undoubtedly is an internal secretion, and equally undoubtedly this internal secretion is poured out into the system by the suprarenal bodies constantly in infinitesimal amounts. The therapeutic deduction from this would seem to be that where adrenal products are used internally for therapeutic purposes, they should be given in infinitesimal doses frequently repeated. It is manifest that large doses at long intervals can at best produce only very powerful and temporary influences, and perhaps do harm.

As a matter of fact a series of papers devoted to the therapeutic application of any drug which is now recognized as a necessity in our materia medica would produce opinions very similar to those which are advanced in the papers to which we draw attention. Even with our experience of many years concerning the influence of digitalis, there are many practitioners at the present time who misuse it, and who, because of their misuse of it, condemn it. Yet

the main body of the profession are fully convinced that digitalis is one of the most valuable remedies which we possess, and it is valuable largely because it is powerful.

With increasing experience in regard to adrenal influences, there seems to be justification for the belief that untoward effects from its use will become less and less frequent, and that good effects will more constantly accrue.

There are some instances in which the employment of adrenal gland for hemorrhage, for example, manifestly cannot be advantageous. Thus, in hemorrhage in typhoid fever, if it is given by the mouth, the digestive juices, in all probability, so alter it as to prevent it from exercising its physiological influence; and again it is not to be forgotten that where a blood-vessel in the lung or in the intestine has become ulcerated, and is giving rise to free hemorrhage, it is unreasonable to suppose that the administration of suprarenal gland can by any possibility check that hemorrhage. What surgeon would think of controlling a hemorrhage from the dorsalis pedis artery, or even a much smaller vessel, by the internal use of suprarenal gland. He would know that by the increased arterial pressure produced all over the body through its influence its administration would probably tend to increase the hemorrhage rather than decrease it. So in profuse internal hemorrhages it is manifestly a mistake to reflect unfavorably upon the therapeutic value of adrenal products, whereas we know that when they are applied to small oozing surfaces they act in a most happy manner in contracting capillaries and preventing further oozing. Marvelous as the influence of adrenalin may be, it is manifestly not miraculous.

In uterine hemorrhage Clark, according to an article contributed to the June issue of *Progressive Medicine,* uses adrenalin chloride injected into the uterine cavity with very beneficial results.

POISONING FROM THE LOCAL APPLICATION OF CARBOLIC ACID.

About a year ago we published in the editorial columns of the THERAPEUTIC GAZETTE an article which dealt with this important matter, and in connection with this article we published a plate illustrating the gangrenous changes produced in the fingers by the application of weak solutions of carbolic acid. Since that time our attention has been called to this matter on several occasions in foreign and American journals, and still more recently an interesting case has been reported by Dr. Wainwright, of New York, in the *Boston Medical and Surgical Journal* of April 3, 1902, in which a man of fifty years, weighing 225 pounds, applied quite freely a four-per-cent solution of Calvert's carbolic acid immediately after a hot bath for the relief of pruritus. The application was made over the abdomen, pubes, thighs, and lumbar region, a four-per-cent solution being used in place of a two-per-cent solution which had recently been employed. Seven and a half hours later, the anesthesia having disappeared, pain was suddenly felt in the bladder, and this extended through the abdomen, rapidly becoming so severe as to cause great alarm, and requiring repeated hypodermic injections of morphine for its relief. Twelve hours after the application was made the patient became drowsy, and then would be awakened by severe lancinating pains. The urine was of the characteristic smoky appearance from carbolic acid poisoning, and there was great depression for three days, with evidences of acute nephritis. While no report is made that the skin underwent gangrenous change, this is an interesting confirmation of the fact that carbolic acid, even when quite dilute, is by no means a harmless substance.

THE TREATMENT OF HAY-FEVER.

Within a short time after the appearance of this issue of the GAZETTE, and simultaneously in some portions of the country, a considerable number of people will begin to suffer from their annual attack of hay-fever. It is unfortunate that our knowledge of the pathology and therapeutics of this affection has not advanced as far as we could wish, but nevertheless the condition can undoubtedly be treated much more successfully at the present time than it could some years ago. Aside from the avoidance of the existing cause by residence in some parts of the country where the cause is not prevalent, there are two drugs which are always to be remembered as of value in this affection, namely, antipyrin and suprarenal gland. It

is quite true that cocaine is a valuable remedy, but its influence is fleeting, and there is grave danger of producing the cocaine habit if the drug is put into the hands of the patient for his own use. In the hands of the physician an application of cocaine to the mucous membrane of the nose, followed by an application of a solution of antipyrin, from two to four grains to the ounce in a little camphor water, will often give great relief. As the application of antipyrin is primarily painful, before it is anesthetic, we think that cocaine should precede it. In other instances, suprarenal gland may be given internally with the hope that it will contract the turgescent blood-vessels of the nasal mucous membrane, but it is not to be forgotten that when taken by the stomach this substance seems to be distinctly altered by the digestive juices, so that its full effect can only be obtained when it is used hypodermically. For hypodermic use and also for local use we believe that adrenalin chloride should be employed, as a very large number of physicians all over the world have found that it produces excellent results in many cases. Apropos of this we desire to call attention to the article of Dr. Kyle in this issue of the GAZETTE.

As we have said elsewhere in our editorial columns, drugs which are capable of doing great good are in certain instances capable of doing harm, so the patient's condition should be carefully studied before resorting carelessly to the use of any of the drugs which we have named.

CERTAIN INVESTIGATIONS ON THE BLOOD AND THEIR POSSIBLE BEARING UPON THERAPEUTICS.

Within the last few years, aside from those investigations which have given us much information concerning the various forms of leucocytes which are present in health and disease, and the discovery of which gives us much diagnostic information, there has also been carried forward a series of other studies which give promise of very much greater value than any results which have followed what may be called "corpuscular investigations." These experiments have dealt with new properties which are acquired by the serum of animals treated with certain cells and with certain microörganisms, diastases, and proteid substances. Among other results obtained in this manner it has been found that it is possible to make an accurate and practically absolutely correct test for human blood which must possess medicolegal value in future trials. This test is based upon the discovery of Uhlenhuth that after five injections of 10 cubic centimeters of defibrinated beef blood into the peritoneal cavity of rabbits, the rabbit's blood-serum not only causes agglutination and solution of the corpuscles of the beef blood, but also a flocculent precipitate in beef serum diluted with salt solution. Similar results were obtained with defibrinated human blood when injected into rabbits. It was found that this test could be obtained with human blood which had been dried for four weeks, and even with blood exposed to decomposition for several months, menstrual blood, and blood mixed with soapy water. In all these instances the test proved accurate and sensitive. Uhlenhuth's studies have been confirmed by others. This is but one of the instances in which the study of certain bodies in the blood-serum which are known as precipitins has already been turned to practical account.

More recently still Flexner, of Philadelphia, has carried out a valuable research upon snake venom in relation to hemolysis or blood break-down, bacteriolysis, and toxicity. For the details of these experiments we must refer our readers to the *University of Pennsylvania Medical Bulletin* for February, 1902. But by the way of summarization we may call attention to the fact that Ehrlich and Morgenroth have found that a special principle is concerned in agglutination of the red cells, and that two principles are concerned in their lysis or breaking down. One of these substances is stable and is the product of artificial immunization; the other is normally present in the body juices, is easily destroyed by heat, and tends to disappear spontaneously when removed from the body. When snake venom is mixed with defibrinated blood or with corpuscles which have been washed in a normal saline solution, it produces agglutination followed by solution of the corpuscles. Even when the solution of venom is so weak that it does not produce agglutination, it is still capable of producing solution, and it will be remembered that the studies of many investigators have long since proved that the action of most of the

snake venoms upon the body consists largely in a solution of the red cells. It was also found by Flexner and his collaborator, a Japanese by the name of Noguchi, that the corpuscles of various animals react to snake venom in a variable manner. Thus, dog's blood was more easily broken down than the blood of the ox, very strong solutions of venom being required to produce hemolysis; but even these are without action upon rabbits' corpuscles. They also found that snake venom contains principles which agglutinate and dissolve white corpuscles as well as red, and that while the agglutinating principle may be identical for both the white and the red cells the dissolving principle for white cells is distinct from that which dissolves red cells, and finally that the different varieties of white cells show different susceptibilities to the action of venom. It is evident, therefore, that the influence of venom upon the blood is quite complex, and that it produces permanent changes in the circulating fluid.

But while it is true that snake venom has its deleterious influence upon the corpuscular elements of the blood, it is also true that the animal body possesses neutralizing substances in its various tissues. To determine which of these tissues exercise the greatest neutralizing power, brain, liver, spleen, kidney, muscle, adrenal gland, and blood were mixed in test-tubes with three times the minimum fatal dose of venom, and after being treated in a similar manner was centrifugalized and the supernatant fluid injected into guinea-pigs. When guinea-pigs were injected with ordinary venom and venom which had been exposed to the action of these various organs, very different results were obtained. Thus, the guinea-pig that received a minimum fatal dose died in forty-five minutes, but the guinea-pig that received a similar dose which had been mixed with brain tissue lived for nineteen hours; that which received venom which had been mixed with blood, three hours and fifty minutes; that which was mixed with adrenal gland, two hours and forty-five minutes, etc., etc. It is evident, therefore, that these tissues must have the ability to retain certain properties of the poison, of destroying them, or of neutralizing their influence.

It is in this connection that these investigations, and others which have been made within the last few months, point to a rational explanation of the action of certain drugs, and we believe that it will ultimately be found that certain tissues of the body have power for neutralizing the influences of certain poisons, and that certain drugs or poisons have in turn a peculiar affinity for certain tissues, not only to the extent that they influence these tissues physiologically, but also that they combine with them, and so are prevented from acting on other portions of the body.

In addition to the influence of snake venom upon the blood there can be no doubt from the experiments of Flexner and Noguchi that the venom contains a poisonous influence for the nervous system which is quite separate from that which destroys the blood, and experiment shows that if snake venom is mixed with brain matter and centrifugalized, this brain matter has the ability of removing the poisonous influence of the venom upon the nervous system without necessarily having any effect upon that poison which affects the blood cells. In other words, to use Flexner's language, brain cells may be said to be the receptors for the neural toxic constituent for the venom, whereas blood cells furnish receptors for the hemolytic principles.

But the influence of snake venom upon the blood does not cease with its influence upon the red and white cells. It goes further than this, and puts aside the well known bactericidal properties of blood-serum. This fact has been known for a long period of time, for it was found years ago that animals which die of snake venom undergo decomposition very much more rapidly than those which die from other causes.

While these researches may not prove of great interest to those who have no interest in snake venom itself, they must be of interest to all who desire to see a rational explanation for the influence of certain drugs upon the human body; and as we have said before, we believe that it will not be many years before studies of this character are extended to drugs, and it may be that by this means our conception of the influences of various remedies in the body will be greatly extended.

THE EMPLOYMENT OF ETHYL CHLORIDE AS AN ANESTHETIC.

While it is true that ether and chloroform are the anesthetics which are by far the most frequently employed for surgical operations, it is also a fact that the profession is still seeking for additional anesthetics which by reason of their speedy and agreeable influences can be employed as substitutes for these older drugs. In some instances it is the wish of the operator to administer an anesthetic which will produce its effects very rapidly, and will then permit the patient to speedily return to consciousness; and it is rather a notable fact that all of the substitutes which have been brought forward to take the place of ether and chloroform, and which have obtained any popularity, belong to a class the effect of which is very fleeting. Aside from nitrous oxide gas, which is, of course, employed to an enormous extent by dentists and to an increasing extent by surgeons, but which nevertheless possesses the disadvantage that its administration requires cumbersome apparatus, there is only one other anesthetic which has lent itself readily to surgery for minor operations, namely, the bromide of ethyl, and this remedy, because of several deaths which have occurred under its influence early in its career, has not gained the popularity which it perchance deserves, although Montgomery and a number of other skilful operators employ it constantly. Doubtless some of the evil effects which have followed its use have depended upon the employment of an impure product, or that which by exposure to light and air has undergone degenerative changes, while in still other instances bromide of ethylene has been ignorantly substituted for bromide of ethyl with disastrous results.

Within the last few years chloride of ethyl, which has been in the hands of the profession for many years as an agent which by its rapid evaporation can be used as a local anesthetic, has been brought forward as a valuable anesthetic when given by inhalation, and quite a large number of cases have now been collected in which chloride of ethyl has been used in this way. In this country its use has been suggested by Bloodgood in a recent summary upon anesthesia in *Progressive Medicine,* and more recently its employment has been suggested in the last edition of "A Text-book of Therapeutics" by the writer of this editorial. Still more recently a paper on the same subject has appeared by Mr. Frank H. Rose in the *Bristol Medico-Chirurgical Journal* for March, 1902.

It will be remembered that when chloride of ethyl is given by inhalation as an anesthetic it must be administered upon a mask which will prevent its rapid evaporation in the surrounding atmosphere, and cause practically all its vapor to enter the lungs. Some of the closed masks which are usually used by English anesthetists in the administration of ether and chloroform can be employed for its use provided that their valves can be stopped so that too rapid evaporation cannot take place.

Another method of administering it when no inhaler is at hand is to use a tin or glass funnel, the narrow part of which is filled with cotton which has been lightly packed inside of it, the large part of the funnel being placed over the nose and mouth. The chloride of ethyl is then sprayed upon the cotton through the small end of the funnel, and the patient receives its concentrated vapor.

Rose reports in his paper that in his belief ethyl chloride is a very safe anesthetic, since it practically does not affect the pulse or respiration. While in 2500 cases collected by Lotheisser, of Innsbrück, one death is recorded, which is a higher percentage than that which is usually credited to chloroform, on the other hand it may be well said that this particular patient was an extremely unfavorable subject, and it is perfectly possible that a larger number of statistics would reveal the fact that this percentage of mortality is far too high. Another thing in its favor is its pleasant odor; the ready induction of an anesthesia which lasts from one to two minutes; the speedy and easy recovery from the condition of unconsciousness; the absence of after-effects; and the fact that the anesthesia produced by it is a little longer than that ordinarily caused by nitrous oxide. Muscular relaxation is rarely complete, and the failure of the drug to produce muscular relaxation is a disadvantage in a certain number of cases. Rarely, in its administration, in Rose's experience, the breathing may be disturbed. Curiously enough the conjunctival reflex is often not entirely destroyed, and the pupil does not invariably contract.

After-vomiting is not met with. Because of the absence of muscular relaxation, struggling during the operation is not entirely put aside. It seems to us that the claims which have been made for chloride of ethyl as an anesthetic by inhalation for a certain class of cases have been sufficiently strong to justify its employment. On the other hand, however, it is to be pointed out that in a discussion which followed the reading of Mr. Rose's paper, Dr. Symes seemed to believe that ethyl chloride was really not as useful as nitrous oxide, and Dr. Harris thought it often failed to produce anesthesia, the patient being noisy during its administration.

RESECTION OF THE PUDIC NERVE FOR RELIEF OF VAGINISMUS AND PRURITUS OF THE VULVA.

It is well recognized that vaginismus and vulvar pruritus are often associated, and that both, but the former much less commonly than the latter, for years may remain rebellious to every form of systemic and local treatment. It is true that these conditions as a rule are dependent upon some local cause, the most frequent being endometritis, certain irritating conditions of the urine, and anal fissures. It many times happens that after a most exhaustive search, the physician absolutely fails to discover any cause for the torturing pruritus, and is constrained to put it down as one of the symptoms of a general neurotic state, the treatment of which is, as a rule, unsatisfactory.

For the relief of this form of intractable, apparently causeless vaginismus and pruritus, section of the internal pudic nerve has been proposed. This nerve innervates the external anal sphincter, the transversus perinei, the bulbocavernous, and the ischiocavernous muscles. It furnishes sensation to the mucous membrane of the urethra, from the prostate to the meatus in man, and from the vesical neck to the meatus in women, also to the vaginal introitus, the labium minor, the prepuce, and the clitoris. In man it innervates the skin of the penis and the glans.

Tavel (*Revue de Chirurgie*, No. 2, 1902) bases his treatment on a study of the distribution of the branches of the internal pudic nerve. He sectioned this trunk for the relief of obstinate pruritus, and with immediately successful results. The patient, forty-eight years old and twice married, had for a number of years been tortured by a vulvar itching. Examination showed that she was a virgin. Even a gentle digital examination of the skin in front of the anus, of the mucous membrane of the region of the hymen, and of the posterior portion of the labia minora, caused cries of pain. The labium major, clitoris, prepuce, and the labiofemoral folds were also extremely sensitive. Strong muscular contracture was induced by an effort to introduce the finger within the vagina. A myoma had been removed without relieving the sufferer in the least, and every form of palliative treatment had been tried in vain. A vertical incision passing between the anal aperture and the ischial tuberosity exposed the artery and enabled the operator to reach the nerve, which was seized in forceps, twisted, and torn out. The same procedure was carried out on the opposite side. The anal branch was not seen on one side, and probably originated at a point behind the incision; on the other side it was divided before it was identified. The patient was relieved from pain, but suffered from slight incontinence when her bowels were loose. She was permanently cured.

A second case, characterized by great apparent sensitiveness, was finally cured, after section of the internal pudic nerve, together with a number of other operative procedures. In this case care was taken to avoid the anal branch, and there was no incontinence resulting.

In regard to the technique of the operation, Tavel strongly advises against division of the anal branches in both sexes, and of the dorsal nerve of the penis in man. The incision should be ischial, and about four inches long. Its middle should correspond to a line drawn from one ischiatic tuberosity to the other across the perineum. After dividing the skin and fatty tissues, the finger is carried directly to the internal surface of the ischium, since this is the best way to avoid the anterior hemorrhoidal nerve. On palpating the tissue covering the internal obturator muscle, the pulse of the internal pudic artery can readily be felt. It is usually not necessary to follow the nerve up to the lesser sciatic foramen, since all the nerves which require section are usually found grouped about the artery. The fascia covering the nerves and artery hav-

ing been opened, the former are separated from the blood-vessels. The anal ramification of the perineal branch must be recognized, since it is important that it should not be sectioned. The penile branch,usually lying deeply in its canal, is sometimes abnormally placed, and must be recognized. The muscular branches can readily be identified by stimulating them and noting the resultant twitchings. The distribution of the sensory branches may also be determined by pulling on them, when the skin to which they run will be drawn in.

This procedure has often been suggested, but it has seldom been tried. It seems rational, and is worthy of application in those obstinate cases of either vaginismus or pruritus which have resisted all other forms of treatment and which undermine the health of the sufferer.

NEW TREATMENT OF HEMORRHOIDS.

The time has long since passed when the sufferer from hemorrhoids was doomed to a patient endurance of his ills, to the application of the ligature, or clamp and cautery at the hands of the regular profession, or to seek the ministrations of irregular practitioners who often accomplished cure by means less immediately formidable and crippling. At the present date the profession generally recognizes the curative effect of dilatation under nitrous oxide in selected cases, of the injection of carbolic acid solutions, or of excision and suture when neither of these methods seems applicable.

Dilatation is a measure at times mainly palliative, though it may bring relief from distressing symptoms for months and even years. Injection is often absolutely curative. Both these treatments may be carried on without subjecting the patient to confinement in bed, and both are, as a rule, attended by so little after-pain that the ordinary business life of the patient is not materially interfered with. Incision for the relief of the pain incident to acute thrombotic piles is also an excellent procedure which, when practiced under local anesthesia, is painless, and does not necessarily interfere with the daily routine of life. The operation of excision and suture usually implies rest in bed for a few days.

After the use of the clamp, cautery, or ligature, the patient is, as a rule, confined to bed for one week and often for two weeks, and there may be such agonizing pain, and this in spite of wide dilatation of the sphincter, that large doses of morphine are required for its relief.

The total excision of the pile-bearing area, as advocated and practiced by Whitehead, and by many other surgeons, is now practically abandoned, not because of the difficulty of the operation, for it is a very simple one, though often attended by profuse bleeding, but because the after-effects have been most unsatisfactory. Intractable stricture has developed in a number of cases, and, almost equally distressing, a partial incontinence of feces. Even when fecal continence has been completely preserved, there has developed a permanent condition of anal anesthesia. Such patients have been unable to control the escape of wind, thus exposing themselves to constant mortification.

In view of these facts it is interesting to note that in the *Revue de Chirurgie,* No. 5, 1902, Potarca advocates a modification of the Whitehead operation, which, because of his method of performing it, he regards as a new procedure. Moreover, he has apparently discovered from a perusal of the proceedings of various medical societies and current medical literature that the Whitehead method is at present the one most widely accepted and the one generally employed. This suggests that in Roumania, the scene of Potarca's activity, the medical journals of five years ago have but just been received. None the less, his device for simplifying the excision of the rectal mucous membrane or the diseased areas lying beneath it is extremely ingenious.

He has had constructed a number of wood cylinders, three or four inches long and an inch or an inch and a half in diameter. These cylinders are a little thicker in the middle than at the ends, and each is provided with a copper handle. The patient having been anesthetized, the sphincter is widely stretched by a dilator into the lumen of which is slipped the wood cylinder until its proximal extremity lies well within the anus. It is held in this position while the bivalve speculum is slipped out. Surrounding the anal orifice, pins are thrust obliquely inward, through the mucocutaneous juncture, into the wood. These pins are spaced about one-third inch apart, and completely encircle the anal aperture.

Then, by pulling upon the wire handle of the wooden cylinder, the anal aperture is made to bulge, after which a circular incision is carried around it just outside the position of the pins. The skin and external sphincter are then dissected up, exposing the mucous membrane of the rectum together with its dilated veins. The latter are ligated or extirpated. After this the cylinder is pushed back again, the pins are extracted, and the incision is sutured. If the mucous membrane is extensively congested and diseased, the circular incision is carried down to the wooden cylinder, the healthy mucous membrane being then united to the skin margins. In other words, there is a complete circular resection of the pile-bearing area. This operation Potarca says requires only from fifteen to twenty minutes.

In the cases reported, this circular resection seemed well suited, since they were complicated by fissures or ulcerations. Hence when the hemorrhoids are complicated by intractable ulcerations of the mucous membrane, it would seem wise to consider a complete circular operation. For the relief, however, of simple hemorrhoids, it is undesirable for the reasons already given.

Reports on Therapeutic Progress

SMALLPOX AND ITS TREATMENT.

In the *New York State Journal of Medicine* for April, 1902, HUBBARD tells us that in moderately severe cases of smallpox it is wise to bathe the patients at least twice a day. This seems to have a very beneficial effect upon the skin, heart, kidneys, and respiration. A bath given before retiring causes very refreshing sleep. To the water that is used for bathing and sponging it is a good plan to add permanganate of potassium, say from one-half to two grains to the ounce. This seems to have no deleterious effect, is not absorbed, and certainly has a very satisfactory effect upon the odor in the pustular and desquamating stages. This also seems to have an effect in lessening the tendency to sepsis and hastening drying and peeling, and also lessening the tendency to furunculosis. During the pustular stage it is also considered wise to give quinine, say five grains, three times a day until some unpleasant effects appear, then to reduce it to two grains.

The nutrition of the patient should be closely guarded at all times, and everything used and pushed to the limit to maintain strength—predigested foods, extracts, milk, kumiss, and, in fact, anything that is easily swallowed and is nourishing. Broths and beef tea are considered good stimulants, but bad for general use, as they tend to cause flatulence. The treatment of smallpox in its many forms more closely resembles the modern treatment of typhoid fever than anything else. In fact, if one will closely study the features in typhoid fever, he will closely strike the key toward successful treatment of smallpox.

Strychnine, strophanthus, and digitalis are to be given either separately or in combination when the heart shows a tendency to flag. Whiskey in the later stages is good and acts excellently; it is the best adjuvant to the food that we possess. In septic cases whiskey can be pushed to a remarkable extent, large quantities being taken and apparently assimilated with good effect. Remember the advice of a once distinguished physician who said: "Don't let them die sober!" In the feebleness of exhaustion it is wise to rest the stomach at times, and in order to do so nutritive enemas are to be given. The bowels in the septic stage may become constipated, and here it is wise not to give calomel, as it has a tendency toward salivation. Salines and phosphates of sodium meet the demands in the majority of cases.

The care of the mouth and eyes is very necessary in the eruptive and desiccating stages. The eyes should be frequently washed with warm boric solution (℥j to Oj). If there is a swelling of the lids, cold cloths are to be applied continuously. The mouth should be frequently cleansed, as in no disease do sores give more trouble than in smallpox. A warm, aromatic alkaline wash is useful. The tongue should be scraped from time to time with a celluloid scraper. Dioxide of hydrogen is good to use in addition to the above; three or four per cent strength is best. If salivation causes odor, then permanganate of potassium is better. Small doses of pilocarpine sometimes act most favorably.

The skin needs constant attention, not only in one stage, but from the commencement to the end. During the stage of in-

vasion the congestion of the skin, when there is much fever, is to be relieved by baths and cooling applications; alcohol rubs, followed by powdering. If there is a tendency to itching the skin is to be oiled with a carbolized oil. Menthol in some cases works splendidly, but be careful not to use it where it will be confined, as it causes considerable irritation. During the vesicular and pustular stages the indications are to prevent the lesions from being ruptured either by scratching or by the patient moving about the bed. Prevent rupturing of the lesions by wet applications in the form of dressings. In later stages, when the scabs form, the use of oil is indicated.

It is a good plan to have the mild cases and the convalescents in a different ward from the very sick. The convalescent ward is light and comfortable, and is made attractive by papers, books, flowers, and games. The very sick are to be in a distant ward where it is quiet and darkened, and where they are close to their attendants. In the very sick cases there is at times acute delirium that makes them very difficult to treat. It cannot be anticipated, so it is wise to have them at all times under close observation.

The best lotion to keep the skin and the face soaked with is: Boric acid one drachm to one pint, to which is added two drachms of glycerin. This is kept warm, and cheesecloth folded in many layers is wrung out in it and applied. When cold or dry, repeat until the skin is bleached or macerated, and then plain, sweet, or olive oil is applied by means of a close-fitting mask, with only one hole cut in it, diamond-shape, to permit of breathing and eating through a glass tube. The mask is not removed at all except for observation, and then quickly replaced. In one case in which this method was tried persistently the result was very satisfactory. The face was very thickly covered with lesions, and they were situated deep in the skin. To-day it is impossible to tell from the face that she has ever had smallpox, but there are scars on the backs of her hands and a few on the body where the treatment was not applied. In another case a solution of equal parts of oil and lime water was used. This was not quite so successful, but the patient was not as persistent as the first case. Close the points of entry of extraneous germs of infection, and in this way the writer believes that pitting can be prevented. This in many discrete cases can be easily accomplished, but in others it is impossible.

During the drying stage the frequent bathing and oiling certainly has a good effect in hastening desiccation and exfoliation and lessens the tendency to furunculosis. After the scab is exfoliated the skin under the scab is purplish, surrounded in the dark places by a layer of pigment more or less broad in area, giving a very striking appearance. This discoloration disappears in from one to three months. If the scab is picked off too soon a small ulcer forms, with a blood scab over it, and this will delay healing.

THE X-RAYS IN MALIGNANT DISEASES.

We present this week a full report of a meeting of the Harvard Medical Society of New York City, at which the subject of the employment of the *x*-rays for the treatment of malignant disease was fully discussed.

There has been almost from the first introduction of the *x*-rays into medicine a feeling that this powerful agent should prove of practical therapeutic value. This feeling is evidently not doomed to be entirely disappointed, and recent observations show that the curative possibilities of this form of electrical energy are very great. Conservative observers find that practically every form of reasonably limited external cancer is improved by exposure to the *x*-rays. This means that not only relief of annoying symptoms is afforded, but that actual disappearance of cancerous nodules and rapid healing of malignant ulcerative processes takes place. While for extensive cancerous involvement, or for deep-seated malignant tumors, treatment by this means is not encouraging as regards ultimate favorable prognosis, exposure to the *x*-rays never fails to bring relief of pain, and this relief often endures for several days after the treatment.

All this promises well for a new remedy for these most hopeless conditions. For in spite of great advances in surgery in recent years, the attitude of surgeons generally, and especially of those with most experience, has been very pessimistic as regards radical cure in these cases. It is true that surgical intervention is most hopeful in just the class of cases in which the *x*-rays prom-

ise to be of service, but a new and promising method of treatment will prove welcome, not only to medical men, but even to those who make a specialty of surgery. For one reason, the absence of cutting will encourage patients to put themselves under medical care much sooner than has hitherto been the case.

Practically the only hope of radical cure in malignant disease is founded on the treatment of the condition at the earliest possible moment, before involvement of deep tissues or metastatic extension has rendered the prognosis doubtful no matter what method of treatment is employed.

The use of the *x*-rays in malignant disease has its limitations. Dr. Coley's report with regard to cases of rapidly growing sarcomata shows that these tumors are as a rule very little or not at all affected by *x*-ray treatment. Slower growing sarcomata are on the other hand very favorably affected. As a practical rule, the slower the growth of any form of malignant neoplasm the longer it will take to influence it, the more exposures to the *x*-rays will have to be made, and the more prolonged the treatment will have to be, in order to secure radical cure and guard against relapse. Some of the more chronic epitheliomata of the face or old persistent rodent ulcers may have to be treated for months to assure lasting benefit. There is no doubt, however, that when the *x*-rays are curative the eventual cosmetic result is much better than any that can be attained even by ingenious plastic surgery, unless the defect in the tissues has been very large.

There remains the question whether in operable cases the *x*-rays should be preferred to the knife. When the patient is ready to submit to either form of treatment and the malignant neoplasm is limited in extent and favorably situated for operative removal, it would seem the part of conservative therapeutics in the present unsettled state of knowledge to advise operation, reserving the *x*-rays for the first sign of recurrence. Patients will be very willing to submit subsequently to the *x*-rays without delay, and will not fail to keep under observation from dread of the discovery of recurrences, as they otherwise are wont to do. When patients have a deep-seated objection to operation and show a tendency to put off treatment for this reason, the *x*-rays should be employed, and the earlier they are used the more hopeful is the ultimate prognosis.

There would seem to be an especially wide field for the therapeutic effect of the *x*-rays on enlarged glands in cancer cases. In most of the reported cases these have cleared up so satisfactorily as to suggest the idea that the enlargement was due, not to the cancerous infiltration, but to an irritative inflammatory process set up by the absorption into the lymphatics and detention in the lymph-nodes of secondary inflammatory products from around the true cancer area. This suggests the idea that the *x*-rays may prove useful in enlarged glands consequent upon chronic inflammatory processes generally. Tuberculous cervical glands, for instance, may yield to the new agent, and some good results in this line have already been reported. This is not surprising, as lupus vulgaris has in a number of reported cases been cured. Hodgkin's disease in an advanced stage yields to the action of the *x*-rays, and not only do the various external glandular enlargements rapidly diminish in size, but the spleen is also lessened in all its diameters, and the patient's general condition much improved by the resultant absence of discomfort.

The employment of the *x*-rays is, then, most promising; but there is no doubt that during the next year or two more harm than good will result from their use. Charlatans and the inexpert will use them without due precautions, and for many conditions for which they are utterly unsuitable. Sufferers from internal cancer, especially the victims of gastric and uterine malignant disease, will be buoyed up by false hopes until whatever chance there may be of radical cure by operative procedure is long past. No one but a medical man of some experience in the therapeutic use of the *x*-rays should be allowed to use them for curative purposes. Above all, physicians should be wary of suggesting to patients that an electrician who happens tc have some experience in taking *x*-ray skiagraphs should be permitted to apply the rays with hope of possible benefit.

A therapeutic treasure of the greatest importance has been revealed, and it behooves the medical profession to take care to discover its exact limitations and indications and not to allow it to be brought into the serious disrepute that has attached

to every new discovery in therapeutics of recent years, because of the hasty, overzealous enthusiasm of the inexpert and ignorant.—*Medical News,* April 5, 1902.

SOME THERAPEUTIC HINTS.

SQUIRE suggests the following points in *Treatment* for April, 1902: A very large proportion of the patients, especially in the colder seasons of the year, come to get relief from cough, and no symptom requires more judgment in treatment. It is, of course, comparatively easy to check a cough by sedatives, yet the writer seldom prescribes a sedative for cough. For many cases of cough an expectorant, which helps the phlegm to come up more readily, is required, the cough is made more effectual, and therefore less frequent and less straining. In cases of reflex cough treatment should be directed to the primary seat and cause of irritation. A man with chronic phthisis says that nothing does him so much good as the medicine he gets from the writer; it stops his cough quicker than anything else. Yet it is not a "cough mixture," but simply an acid tonic. It is interesting to note in how large a proportion of the cases who apply for relief because of cough there is no cough mixture prescribed, and yet relief is obtained. In many cases of bronchitis great benefit seems to be derived from counter-irritation to the chest by the use of the acetic turpentine liniment.

Here is the case of a tailor who came last week complaining of cough, with yellow expectoration. The following was prescribed:

> Tinc. nuc. vom., min. v;
> Sp. ammon. arom., min. xv;
> Sp. chloroformi, min. ix;
> Inf. calumbæ, f℥ss;
> Aquæ, q. s. ad f℥j.

To be taken several times a day. Liniment of turpentine is to be rubbed on the chest and back at bedtime.

This writer concludes his jottings from the out-patient room with two prescriptions which he frequently finds useful. The first is a very simple one, which is worthy of notice merely because it has obtained a reputation amongst the patients as a specific for facial neuralgia—it is ferri et ammonii citratæ, with 3 to 5 minims of tincture nucis vomica.

Facial neuralgia is generally an expression of lowered vitality—the person has "run down"—and anemia is a common cause of ill-health. This probably explains why the above simple remedy is so often successful. It will often be found that there is a bad tooth to determine the seat of the neuralgia, and this should be attended to when the neuralgia is over.

The second prescription is very useful in some forms of dyspepsia, especially such as result from alcoholic excess. It is a modification of a mixture learned from the captain of a transport in which the writer was brought home from the Soudan in 1885. During the campaign at Suakim many of the transports were kept several weeks or months at the southern anchorage, and dysentery and other intestinal complaints were common. The captains had to rely on themselves for the treatment of their crews, and their favorite dose was as follows:

> Tinc. capsicum,
> Tinc. rhei,
> Tinc. nuc. vom.,
> Spirit. chloroformi,
> Tinc. opii,
> Tinc. zingiberis, of each 10 minims.

Ten minims of tincture of rhubarb is hardly enough to have much effect, and it wants a fairly tough mucous membrane to stand ten minims of tincture of capsicum, but modified as follows the prescription is very useful:

> Tinc. rhei, min. xx;
> Tinc. nuc. vom., min. v;
> Tinc. capsici, min. iij;
> Sp. ætheris, min. xv;
> Aq. menth. pip., q. s. ad f℥j.

There is nothing that is novel in the above notes. The justification for presenting them is that the cases seen are those which furnish so large a proportion of the routine work of ordinary practice. All the cases referred to in this paper are typical of conditions which may cause difficulties in diagnosis.

REMARKS ON TREATMENT OF TYPHOID FEVER.

The *St. Paul Medical Journal* for April, 1902, contains a paper by THAYER in which he has these words to say with regard to methods of treatment of typhoid fever:

We have no specific against typhoid fever. We possess no antitoxin such as we

have against the poison of diphtheria; we know as yet of no method by which we can definitely stop the growth of the organism. In a large proportion of cases of typhoid fever, in all at the beginning, we have no local lesion which we can influence by active treatment. We are confronted by a general septicemia, and the essential principles of typhoid fever are the same as if we were dealing with an instance of ulcerative endocarditis, namely: (1) complete rest; (2) a diet as nourishing as the condition of the patient will allow; (3) measures to relieve the hyperpyrexia and to keep the skin and muscles in as good condition as possible; (4) an ever-watchful carefulness for the various dangerous complications.

A word with regard to the diet. It should be generally recognized that the diet is a very important point in the treatment of typhoid fever; perhaps not in the sense that we must absolutely restrict our patient to milk and liquids, but in that we must adapt our diet to the condition of the patient.

There is no question of the fact that liquid diet is best adapted to most cases of typhoid fever, but there are many instances with few abdominal symptoms, a reasonably good general condition and a fairly good appetite throughout, in which considerable latitude of diet may be allowed, and in which variety is really important. Here the author refers us to the excellent article by Dr. Shattuck upon the diet in typhoid fever in the *Journal of the American Medical Association* (1897, xxix, 51). As Shattuck justly says, we must treat our patient and not the disease. It is necessary in text-book articles to lay down certain general rules, but he who blindly practices medicine from text-book rules has a small conception of his duty to the community. If medicine could be practiced by rule, the function of the physician would be small.

The value of the cold-bath treatment of typhoid fever, which was well recognized by Nathan Smith, of New Haven, in 1824, is unquestionable. It should be remembered, however, that its value is not alone in reducing temperature. The general effect upon the circulation and the nervous system, and the judicious massage which should always accompany the sponge or the bath, probably play an important part in contributing to the good effect.

With regard to the care of the bowels in typhoid fever, the conclusion which has been generally reached by most experienced clinical observers is that it is undesirable to administer laxatives by the mouth, or to interfere any more than is absolutely necessary with the function of the intestine during the course of the fever. Considering the nature of the lesions which are commonly present, it seems that this is the rational course. In Professor Osler's clinic it is the general rule to give enemata every other day in case of constipation, but otherwise to strictly let the case alone.

With regard to the so-called intestinal antisepsis, the main reasons which seem to render attempts in this direction inadvisable at present are:

1. That the demand for the so-called intestinal antisepsis is based upon a misconception. At the time when we begin treatment it is probable that the number of typhoid bacilli in the intestinal canal is inconsiderable; the symptoms are due entirely to bacteria which are already within the organism and out of our reach.

2. That to accomplish anything like effective intestinal antisepsis is utterly impossible.

3. There is no evidence of any value in support of such a plan.

With regard especially to a certain "method" of treatment which has been extensively heralded, the same reasoning applies, and in addition there are, it seems, other excellent arguments against its employment. It is extremely important that the patient with typhoid fever should be disturbed as little as possible, but the constant dosing, such as is associated with this method of treatment, is the worst type of meddlesome therapeutics. In addition to this, diarrhea, which may be caused by the calomel, is unquestionably harmful in some cases. There is no evidence that the treatment is of value. This method has, so far as known, only one recommendation: it is good for the nervous family.

The essential features of the treatment of typhoid fever are rest, diet, bathing and massage, proper nursing, together with watchful symptomatic and stimulating treatment, and careful, intelligent observation of the case in order to recognize at the earliest moment the more dangerous complications. This latter point is one of the most important in the treatment of typhoid fever. The complication which it is most

important to recognize is perforation. But a few years ago perforation following a typhoid ulcer was regarded as necessarily fatal. In fifteen cases of typhoid perforation operated upon by several surgeons connected with the Johns Hopkins Hospital in the last few years, there have been six recoveries, or forty per cent. In Professor Osler's clinic alone, eleven cases have been recognized and operated upon, with five recoveries, a percentage of 45.4 per cent. This percentage is unquestionably higher than is likely to be obtained in private practice owing to the advantages offered by a hospital for careful observation of the patient. The one important point in the treatment of typhoid perforation is that it be recognized as early as possible. But the onset of the perforation is frequently extremely difficult to determine, and a diagnosis is often to be reached only by the careful weighing of every symptom. Frequently recorded observations of the patient, of his pulse, of his respiration, his temperature, the condition of his leucocytes, are of the utmost importance; and in carrying out such observations the physician in a hospital has a great advantage over the colleague in private practice.

HAY'S REACTION FOR BILE SALTS IN THE URINE.

BEDDARD and PEMBREY remind us in the issue of the *British Medical Journal* of March 22, 1902, that in the second edition of Landois and Stirling's Text-book of Human Physiology, 1886, Prof. Matthew Hay published in a short note the fact that, when powdered sulphur is sprinkled on a fluid containing bile, it gradually sinks. He further showed that this reaction depends upon the presence of bile salts alone, and that when one part of pure bile salt is dissolved in 120,000 parts of water the reaction is still given; he also stated that this reaction depends upon the power of bile salts to reduce surface tension. Professor Hay published no further account of his extensive experiments, which he informs us began in 1882, and his useful discovery escaped general recognition.

Recently two papers dealing with this reaction have been published by Frenkel and Cluzet, and another by Chauffard and Gouraud, in all of which the test is ascribed to "Haycraft" instead of to Hay. These authors, in ignorance of the previous work and only knowing the test as the "sulphur test," have again covered some of the ground for the third time.

Their object in writing this note is to correct the partial misunderstanding as to the name of the investigator who discovered the test, and further to draw more general attention to its clinical value.

The fluids in which a delicate test for bile salts would be most useful are vomit, feces, and urine. Hay's test, however, is less reliable in the case of vomit and feces than in that of urine. For it has been shown that substances other than bile salts, which also have the power of reducing surface tension, may occur in vomit and feces, and might under special circumstances be present in sufficient quantity to introduce a serious fallacy. The most important of such substances are alcohol, ether, chloroform, acetic acid, acetone, turpentine, phenol, skatol, and soaps. In the majority of these the power of reducing surface tension is small as compared with that of bile salts.

With urine the case is different, for none of the normal constituents give the reaction. None of the substances other than bile salts, which do give the reaction, have ever been found to occur in urine in sufficient quantity to introduce a fallacy, and there is no drug at present known which, when taken, invalidates this test.

The simplest method of carrying out the test is to place the urine in a test-tube with a diameter of about one inch, and to throw some sublimed or finely powdered sulphur upon it. If any begins at once to fall in the urine there is at least one part of bile salts per 10,000. If none falls at once, then, after waiting one minute, the test-tube is given a very gentle shake; if sulphur now begins to fall, there is at least one part of bile salts per 40,000, and so on for further dilutions.

Few precautions are necessary. The urine must be free from air bubbles, it must be clear, and if it is necessary to clear it, this must be done by filtration and not by heat. For all specimens of urine at the temperature of the body give the reaction at the end of one minute, owing to the effect that heat has in lowering the surface tension of a fluid; therefore in every case before the test is applied the urine must be cooled to about 17°C. The reaction of the urine and its specific gravity do not in any

way affect the accuracy or delicacy of the test.

The delicacy of Hay's reaction as compared with that of Pettenkofer's test is very great; for, apart from the fact that in applying Pettenkofer's test to urine there are so many fallacies as to render it almost useless, one part of bile salts per 1000 gives only a doubtful Pettenkofer's reaction.

Many urines in various pathological conditions have been tested, but no case giving the reaction has yet been found in which the clinical condition was not such as to make the presence of bile salts in the urine possible. Thus it has been found that Hay's reaction is frequently given by the urine from cases of backward pressure in cardiac and pulmonary disease, and in cases of suspected cirrhosis of the liver, even when bile pigments were shown by the iodine test to be absent. In two cases of suspected cirrhosis of the liver the reaction was given only intermittently, being present on one day and absent on the next. In a case of gall-stones with jaundice which was operated upon and the obstruction removed, bile salts were found present in the urine for a fortnight after the bile pigments had disappeared, and when the patient in appearance was quite free from jaundice.

It has further been noticed that jaundiced patients differ greatly in the relative amounts of bile salts and bile pigments which their urine contains. For instance, the urine from a case of cirrhosis of the liver, which was scarcely darker in color than the normal, was found to contain but little bile salts.

Hay's test is so simple that it certainly deserves more extended use in clinical work, especially in investigations upon the relative excretion of bile salts and bile pigments.

TREATMENT OF CHRONIC ECZEMA.

In the *British Medical Journal* of February 15, 1902, EDDOWES in speaking of the treatment of this affection emphasizes, very wisely, the fact that as our knowledge of bacteriology and pathological processes increases the term eczema will be less frequently employed, or more frequently qualified by an adjective indicating its causation.

It is impossible to separate the consideration of the treatment of chronic eczema from that of its causation. It is obvious that if a condition called eczema be produced or kept up by the presence of microörganisms, as in what we still call impetiginous eczema (but which the author is prepared to call staphylococcogenic dermatitis), we must kill or at least check the growth of these microörganisms by suitable germicides. But if eczema be due to other causes than germs, even though such appear as a complication, we must try to discover that cause if we would permanently relieve or cure a patient. We may at present safely assert that the contention that eczema is always of parasitic origin is not yet definitely proved, but that germs soon appear and look suspiciously like a cause, and at least form a complication. Of this the author has convinced himself by frequent histological and bacteriological examinations. We see every day that toxins flowing over the skin from the ears, eyes, nose, abscess cavities, and scabs can scald, so to speak, and produce an eczematous condition. It appears fortunate that the germs found in connection with eczematous conditions, whether as cause or complication, generally remain superficially situated, and, therefore, within reach. The great importance of keeping this in mind can be easily illustrated by a single case, which will show its bearing on every-day practice.

A lady had had severe and almost general eczema upwards of a year, and had been unable to obtain satisfactory lasting relief. The author was fortunate enough to be called in, although the lady had begun to think herself incurable. Many patches of skin were thickened and very pruriginous, while others were moist, or crusted in such a way as to suggest that the skin required rest and protection. He fetched his gluepot containing Unna's zinc gelatin, because he felt certain that the zinc gelatin would prove an invaluable remedy for such a severe, raw, smarting case. The moment the lady saw it she exclaimed: "That is Unna's gelatin stuff; I cannot bear it. Mr. So-and-So," mentioning her last attendant's name, one of the ablest surgeons of our day, "tried it, and it utterly failed." When asked how the gelatin dressing had been applied, she said it had been heated and painted on the affected surfaces and then dabbed with cotton-wool. In answer to the question whether anything had been done to the skin before the gelatin was applied by way of preparation, she said "No." Then

she was informed that that was just the secret in her case, and that it was the intention to carefully prepare all the spots requiring the application of Unna's dressing. The author explained to her that he had a reason for each step he was about to take, and strongly advised her to let him proceed without interruption in his own way, and half promised her that she would feel immediately better, and be able to dispense with night draughts which her previous attendants had found it necessary to prescribe for her. The author wetted the whole surface to which he intended to apply the gelatin with a solution of carbolic acid; then he applied spirit, after which, with the intention of drying the skin and leaving a very mild antiseptic in contact with it, he dusted it with starch powder containing a little boric acid. The gelatin was then applied in the usual way.

The result was fully up to his expectations. He did not commit the common, and as he believes the fatal, mistake of covering in and assisting the growth of any micro-örganisms that might have got into and be living upon the exudation which was drying upon the surface. What would any modern surgeon think of any of us if we dressed a wound which had been exposed to contamination for days with such a simple material as gelatin and oxide of zinc, and expected it to remain aseptic for several days or a week without renewing the dressing? Yet such seems to be still the practice of many who use this invaluable dressing. The exuded serum or coagulating albumen upon an eczematous surface is an ideal medium for the cultivation of germs pathogenic to man.

One of the most important points, as we all know, is to obtain physiological rest—that is to say, peace for the tingling terminal filaments of nerves of sensation, and those governing the nutrition of the skin. How is that to be secured if we apply soothing remedies, which do not kill, but rather encourage the development of germs capable of producing irritant toxins, as we know they do; or if we, in order to kill these germs, apply antiseptics which act for too long a time and aggravate the eczema, as they might a superficial burn or scald?

It may be objected here that this was a chronic eczema; and it might be asked why it was compared by the author with an acute eczema. His answer would be that there is no fine line to be drawn between the acute and chronic. It was only because the repeated little acute outbreaks were not completely subdued that this lady's case lasted so long. Some parts of her skin appeared normal or nearly so, others were acutely eczematous, others much infiltrated. This is generally the case with chronic eczema. We must take cases as we find them; there is no stereotyped plan or royal road to the cure of eczema.

Treatment must be suited to the locality and the severity of the inflammation or irritability of any given portion of affected skin. But there is no difficulty in formulating at once one golden rule: soothe angry spots before attempting to excite absorption in an indurated patch anywhere near them.

REPORT OF CASES TREATED WITH ROENTGEN RAYS.

The following abstract from an article by PUSEY in the *Journal of the American Medical Association* of April 12, 1902, is of interest in connection with the paper on this topic contributed to the March issue by Pfahler:

Pusey does not report an unbroken series of successful cases treated with *x*-rays, but believes the results attained are such as to give encouragement. For it must be borne in mind that the cases reported are of a character that will never allow of an unbroken series of successes. Excepting a few epitheliomas the whole list represents cases which had baffled skilful men or had been passed upon as hopeless by masters of the profession. A more unpromising group of cases could hardly be imagined. That even some of these cases have been controlled or had their progress stayed seems enough. Many of these cases, when they came under treatment, had attained a much more serious character than they had when first recognized as hopeless. When such cases are put under the influence of *x*-rays sooner, is there not good reason to hope for a better showing?

The cases are presented for what they are worth, and each one will give them whatever weight he considers they are entitled to. One important fact may be claimed as established, not only from these cases, but from the work of other men, namely: the *x*-rays have a destructive ef-

fect upon tissues of low vitality, and this effect can be utilized under suitable conditions to cause the destruction of such tissues without destroying the involved healthy tissue.

The author's sections show that *x*-rays cause a degeneration of some sort of carcinomatous tissue, and a disappearance of this degenerative substance, presumably by absorption. This disappearance of carcinomatous tissue is followed by the formation of firm, healthy scar tissue. A similar process presumably occurs in the disappearance of the diseased tissue in tuberculosis, sarcoma, and pseudoleukemia. However it occurs, the fact stands that growths of embryonic tissue and other tissues of low vitality are made to disappear under the influence of *x*-rays without the destruction of the involved healthy tissue; and such a fact is pregnant with possibilities.

The advantages of the method are:

1. It is painless.

2. It destroys diseased tissue, but leaves the healthy tissue in its place.

3. It leaves small scars.

4. It can be used in cases where the surrounding healthy tissue cannot be sacrificed.

5. Hence, it is available for cases in which ordinary methods involve extensive operations and serious subsequent disfigurement, as, for example, about the eye and nose.

6. It is available in cases in which ordinary methods are impossible because of the amount of destruction of tissue which complete removal would require; in other words, it is applicable to many inoperable cases.

7. It often relieves pain.

As a general proposition the use of *x*-rays should be limited to those cases which for any reason it is inadvisable or impossible to treat by ordinary methods. In other words, until our experience with *x*-rays extends over a longer time, their use should be a reserve method of treatment. The use of *x*-rays is not advised as a substitute for operations in operable malignant growths. As regards cutaneous carcinomas—epitheliomas—no strong objection is to be found to the use of *x*-rays as a primary method of treatment, and some advantages are to be urged for it. Every other malignant neoplasm should have the advantage of operation where it is practicable. On the other hand, it is not believed that with the present evidence of the effect of *x*-rays upon malignant neoplasms we are justified in maintaining the following propositions: (1) In all cases of malignant disease which have been operated on there is reason to urge the subsequent use of *x*-rays as a prophylactic measure. (2) In all inoperable cases of malignant disease the use of *x*-rays should be tried. (3) In all such cases there is a probability of relieving pain and a possibility of inhibiting the progress of the disease.

SURGICAL TREATMENT OF EXOPHTHALMIC GOITRE.

The surgical treatment of exophthalmic goitre is regarded by practically all surgeons, and by many physicians, as giving the most satisfactory results.

Complete extirpation of the gland, says PATTON (*Clinical Review*, March, 1902), is generally regarded as inadvisable because of the liability of the after-development of myxedema. Intraglandular enucleation or strumectomy, thyroidectomy, ligation of the thyroid arteries, and resection of the cervical sympathetic are practiced. The latter operation is based on the theory that the disease is due to excitation of the vasodilators of the cervical sympathetic, and that accident following partial or complete removal of the gland results from derangement of the sympathetic nerves and not from the absorption of thyroid secretion.

The exact status of the surgical treatment of the exophthalmic form of goitre cannot at present be stated.

Starr's statistics of 190 goitre operations show a mortality of 17.36 per cent, which Jonnesco thinks does not represent the mortality of typical cases, which would be much higher. These patients take anesthetics badly, and deaths on the table are not uncommon. The statistics of operations are not strictly representative of the actual mortality. Death may occur after operation and be preceded by high temperature, rapid pulse, and severe nervous manifestations.

A CARDIAC TONIC PILL.

Extract of convallaria, 2 drachms;
Sulphate of sparteine, 15 grains.
Make into 60 pills and give 4 to 6 pills a day.

—*Journal des Praticiens*, Dec. 28, 1901.

THE TREATMENT OF SCIATICA.

For the past ten years HÖLSCHER *(Centralblatt für Chirurgie,* Jan. 11, 1902) has treated the severe cases of sciatica, that have relapses in spite of all medical and mechanical means of treatment, by freely exposing the sciatic nerve as it emerges from the sciatic notch and applying for several days a gauze tampon wet with five-per-cent carbolic solution. A favorable and lasting result is thus secured. Only two cases had a recurrence, out of a total of fifteen treated in this way. The poor results were directly attributable to leaving a covering of muscle over the nerve so that it was not properly exposed to the action of the carbolic acid.

The employment of carbolic solutions in the treatment of inflammatory conditions of the sciatic nerve is not a new idea. It was formerly used by means of hypodermic injections, but it was found unsafe and its use discontinued.

The above method of applying carbolic acid was first tried in an especially severe case of sciatica that had resisted all known forms of treatment. An incision ten centimeters long was made over the course of the nerve from a point midway between the tuber ischii and the great trochanter. The fat and fascia were divided, the overlying muscles separated, and the sciatic nerve exposed and freed from the connective tissue for a distance of six centimeters. A gauze tampon, about the size of a hen's egg, was saturated with five-per-cent carbolic solution and placed in contact with the nerve. The wound was then closed except for a small opening at its middle. Dry gauze was placed over the tampon to protect the skin and muscles. The tampon was removed on the third day.

The effect on the sciatic pain was surprising. The patient could move his leg without pain as soon as he recovered from anesthesia. After some hours there developed a numb sensation in the calf of the leg. During the first two nights following the operation there was so much burning pain in the wound that hypodermics of morphine were required. The pain was less severe after redressing the wound. This unpleasant symptom has been present in nearly all of the cases, but it was later discovered that the burning pain could be partially relieved by replacing the dressing of dry gauze with one wet in bichloride solution. Some patients complained during the first few days following operation of pain in the knee, in the ankle, or in the anterior muscles of the thigh, or of remaining traces of the old sciatic pain. All these symptoms disappeared after changing the dressing and applying another carbolic tampon.

Macroscopical changes were not found in the nerve in any of the cases, but the connective tissue sheath was generally deeply congested. Fibrous adhesions between the muscles near the sciatic notch were frequently found, and during motion of the legs these adhesions must have pressed on the nerve and have given rise to the pain. These adhesions were either loosened or stretched in every case.

Suppuration usually occurred in the wound, and there was often moderate swelling of the inguinal glands, otherwise healing progressed normally. Other complications were never observed. In some cases the sensation of numbness in the leg remained for a time after operation, but always disappeared after light massage was given for a few weeks. A pronounced sensory or motor paralysis was never produced. In some cases, where the carbolic acid was freely used, the action of the drug extended upward and affected the spinal cord as well as other branches of the sacral plexus, but was not productive of any harm. Toxic symptoms never appeared. The action of the carbolic acid always confined itself to the affected side of the body. A transmedullary action of the drug was never observed. The bladder and rectum were never affected. In one case there was a temporary increase in the amount of perspiration secreted.

Most of the cases resulted from exposure to cold and working in damp places. Two cases were caused by traumatism, and in three the cause could not be determined. The spinal cord was usually not involved by the disease process.

ASEPSIS OF THE HANDS DURING OPERATION.

HERMAN *(Centralblatt für Chirurgie,* Jan. 11, 1902) thus summarizes the essential requirements which are necessary in addition to chemical disinfection for sterilizing the surgeon's hands:

1. Care should be taken not to bring the hands in contact with any septic material.

2. The skin of the hands should be kept soft and smooth, as it is then more easily sterilized than when rough and lacerated.

3. The hands should be scrubbed for at least fifteen minutes in running water. Mechanical cleansing is far more efficient than the action of chemicals.

4. The hands should be washed frequently during the operation in order to remove the microörganisms which are constantly coming to the skin surface.

For the accomplishment of this last requirement, washing of the hands in a basin of boric solution or sterile water has proven unsatisfactory. It is very inconvenient to change the basin as well as the solution every time the hands become contaminated, as for instance with gastric or intestinal contents. To overcome this objection, an apparatus was devised consisting of a tube running from a reservoir and containing a stop-cock which could be regulated by a pedal attachment. By means of this convenient apparatus the surgeon and his assistants can cleanse their hands frequently during the operation in a perfectly pure solution. The apparatus is too unwieldy for use in private practice, but a similar result may be obtained by drawing off the solution from any suitable receptacle through a tube used as a siphon.

ACUTE DUODENOJEJUNAL INTESTINAL OBSTRUCTION.

Every experienced surgeon, according to WALZBERG (*Archiv für Klin. Chirurgie*, Bd. 66), has seen cases of acute gastric dilatation following intra-abdominal operations. In some cases which otherwise pursue a normal course, the patient will continue vomiting for several days after the operation, or if chloroform has been used, vomiting will begin three or four days later and symptoms of profound prostration will appear. There is usually no feeling of nausea, the act of vomiting occurs at long (three to four hours) intervals, and large quantities of fluid are expelled. From the beginning the vomited material contains considerable bile; at first it is nearly clear, and has a yellowish-green or dark-green color. It soon changes to a cloudy, dirty, brownish-green, and then gradually to a reddish-brown, and finally to a very dark brown. Microscopical examination now reveals the presence of numerous red blood-cells. The vomiting never becomes stercoraceous. On examination of the abdomen, the stomach is found greatly distended, and its contour can be seen if the abdominal walls are thin. The upper part of the abdomen is protuberant and tympanitic, the lower part scaphoid.

The distention of the stomach might be ascribed to a condition of paresis resulting from chilling and traumatism of its walls during operation. If these were the only factors involved in the process, gastric distention would result more frequently after long laparotomies and vomiting would not occur with so much force.

Eight cases, presenting symptoms of acute gastric dilatation following abdominal operations, recovered after the hypodermic administration of morphine and repeated evacuation of the gastric contents by means of a stomach tube. A ninth case terminated fatally on the seventh day following the opening and drainage of a hepatic abscess. The autopsy findings in this case were very instructive and doubtless furnish the true explanation of the origin of the above symptoms.

No signs of peritonitis were found. The stomach and upper part of the duodenum were enormously distended. The large and the remainder of the small intestines were empty, firmly contracted, displaced downward into the pelvis, and were covered by the omentum. The omentum and intestines felt dry and gave the impression of being adherent. On raising the omentum and the transverse colon, the duodenum was found greatly distended above the point where it passed under the parietal attachment of the mesentery. The base of the mesentery crossed over in front of the gut in the form of a three-inch band, and was firmly held in this position by the displaced intestines. The lumen of the duodenum was thus occluded by pressure against the vertebræ. As this band was slowly cut from right to left, the contents of the duodenum followed the course of the knife and distended the collapsed gut, and when the band was completely severed, the entire small intestine and part of the colon were immediately distended. An incision into the stomach revealed the presence of a mucoid, dirty, greenish-brown fluid.

The mechanism of this condition is clearly explained by a primary dilatation of

the stomach. The atonic intestines are pressed down into the pelvis, and held there to a certain extent by the entangled omentum. The mesentery is dragged upon, pinches the duodenum against the vertebræ, and gives rise to the symptoms of acute intestinal obstruction. The presence of a long mesentery is requisite for the production of the condition.

Bäumler observed the same set of symptoms, as a complication, in the late stages of a fatal case of typhoid fever. The autopsy findings corresponded exactly to the above case. In a second non-operative case, presenting the same symptoms, Bäumler treated the patient by removing the gastric contents through a stomach-tube in order to relieve the pressure on the mesentery, and then placed the patient in the knee-elbow position to assist the escape of the intestines from the pelvis. The vomiting quickly subsided, the stomach became retentive, and the patient recovered.

The knee-elbow position is not applicable in postoperative cases, and simple elevation of the pelvis is not always satisfactory in relieving the patient. One case was successfully treated, however, after emptying the stomach, by turning the patient from one side to the other every three hours.

By a consideration of the following symptoms, acute duodenojejunal obstruction after abdominal operations can be differentiated from other forms of intestinal obstruction:

1. The relatively late appearance of vomiting. This is all the more noticeable if there has been but little or no vomiting directly following the operation. The characteristic vomiting does not begin until forty-eight to sixty hours after operation.

2. An interval of four or more hours between the individual acts of vomiting.

3. The good general condition of the patient during the period between the attacks of vomiting—a progressive weakness does occur early, however, from a lack of nourishment.

4. The afebrile progress of the case, provided the temperature and pulse-rate are not affected by some other complication.

5. The physical signs of dilatation of the stomach, usually accompanied by an abnormal depression over other parts of the abdomen.

6. The composition of the stomach contents, as previously described, is characteristic. The red blood-cells result from a local congestion. Epithelium was never found. The vomiting never becomes fecal as in intestinal obstruction at a lower point.

Before the mechanism of this form of obstruction was understood, nine cases were treated by hypodermic injections of morphine and repeated evacuations of the stomach, as advised by Riedel, but no attempt was made to move the patient from the dorsal position. Eight of these cases recovered. It seems probable that washing out of the stomach excited peristalsis and caused the intestines to shift their position. This, in turn, relaxed the tension on the mesentery and relieved the obstruction. It is possible that the morphine overcame the reflex spasm of the abdominal muscles, but otherwise it was not beneficial, and probably caused harm by diminishing peristalsis.

The best plan of treatment for these cases probably consists in frequent lavage, and if the symptoms do not subside, the patient should have the pelvis elevated or be turned on the side. In severe cases the supine position offers a prospect of relief. If these measures fail a gastroenterostomy should be considered.

ASCITES DUE TO COMPRESSION OF THE PORTAL VEIN.

MÜLLER *(Archiv für Klin. Chirurgie,* Bd. 66) reports a case of ascites in a tailor thirty-four years of age. His father and one brother died of phthisis. Except for a general alopecia of unknown cause which occurred during childhood, the patient enjoyed good health up till his twenty-eighth year. He then had an attack of hematemesis, which recurred in decreasing amounts three times during the week. Previous to this time he had never experienced any cough nor gastric disturbances. He recovered rapidly and again felt perfectly well. Three years ago he had a sudden attack of dyspepsia. A cough, accompanied by expectoration, developed at the same time, and the patient was unable to do any work for six months. During this period he had no gastrointestinal symptoms, and the cough and dyspnea gradually diminished, but never disappeared. Seven months ago the abdomen began to enlarge, and the patient had more pronounced dyspnea and also pain in the region of the

umbilicus, especially on motion. There was no loss in weight and no disturbances of micturition. History of syphilis negative. Patient drank beer in moderation up till two years ago.

On admission to the hospital his color was good; tongue clean and moist; lymphatic glands not enlarged; no edema present; hair absent over the entire body. Heart was normal. Examination of the lungs disclosed a few scattered râles. The abdomen was greatly distended and the physical signs of free fluid in the peritoneal cavity were present. Abdominal circumference 94 centimeters on a level with the umbilicus. Superficial veins were visible through the thin skin over the abdomen.

Urine was normal. Sputum: mucoid, scanty, and did not contain tubercle bacilli.

Disease of the heart, lungs, and kidneys could be definitely excluded as a cause of the ascites. Tuberculosis was considered as a possible cause, but the history and the symptoms of the case seemed to point to an obstruction of the portal vein, probably inflammatory in origin.

There being no improvement after four days' medical treatment, the abdomen was opened by a median incision in the epigastrium. A large quantity of clear fluid escaped. No signs of tubercular changes in the peritoneum were present. Bands of adhesions between the anterior surface of the pylorus and the inferior surface of the liver were found and separated. The surface of the liver appeared normal. A resistance was felt in the posterior wall of the pylorus. An incision was made in the omentum and the pylorus exposed. Thick firm adhesions bound the pylorus to the hilum of the liver. These were carefully separated, so that the pylorus could be drawn forward. The posterior wall of the pylorus was thickened, but otherwise the stomach was normal. The bile-ducts and hepatic vessels were surrounded by a mass of indurated tissue, from which they were partially isolated by dissection. A Mikulicz drain was introduced between the pylorus and hilum of the liver. The abdominal wound was then closed except at the point of drainage.

There was an increase in cough and expectoration for a few days after operation, but these soon subsided and the patient made a satisfactory recovery. A small amount of ascites persisted for a few weeks after operation, but it gradually disappeared and has been absent for the past six months.

The diagnosis of an inflammatory obstruction of the portal vein, probably secondary to a gastric ulcer, in this case was confirmed by the local condition found at the time of the operation, the course of the case after operation, and the absence of any other cause for the ascites.

A second case of a somewhat similar nature was observed in a patient who was operated upon for an impermeable stricture of the bile-ducts. Ascites had been present in this case, but it did not recur during the six weeks that the patient lived after operation.

INDICATIONS FOR THE TREATMENT OF APPENDICITIS.

After a careful study of his cases during the past three years, WETTE *(Archiv für Klin. Chirurgie,* Bd. 66) has formulated the following rules regarding the treatment of appendicitis:

1. Simple acute appendicitis is generally best treated by internal medication.

2. The chronic and relapsing forms can be cured only by excision of the vermiform appendix.

3. Cases of perforative appendicitis are best treated as follows: (*a*) Operate immediately whenever the signs of acute general peritonitis are present. (*b*) Unless the presence of general peritonitis can be positively excluded, operate at once in order to be on the safe side. *(c)* Cases of circumscribed peritonitis or perityphlitic abscess should be operated upon if the symptoms do not subside within three or four days; earlier operation is a safer procedure. *(d)* Immediate operation is advisable in all cases of acute localized peritonitis where the onset has been unusually severe.

4. Cases of relapsing appendicitis, in which the acute attacks recur frequently, or in which the patient suffers from intestinal adhesions, should be operated on during the interval.

5. Narcotics, such as morphine and opium, are to be avoided during acute attacks because they obscure symptoms and check peristalsis.

6. The appendix should be removed in all cases, as it does not add to the gravity of the operation.

From this it will be seen that German

surgeons are not familiar with the rules of procedure now universally adopted by American surgeons in cases of appendicitis.

THE OPERATIVE TREATMENT OF VENOUS THROMBOSIS.

MÜLLER (*Archiv für Klin. Chirurgie*, Bd. 66) states that the adoption of the ligation of the internal jugular vein in the treatment of septic thrombosis of the lateral sinus has reduced the mortality of this affection from nearly 100 to 52 per cent, or even to 22 per cent, as shown by statistics. It is generally recognized that infectious thrombi can develop from local inflammatory processes in other parts of the body and subject the patient to their dangerous sequelæ. It therefore seems proper, reasoning by analogy, to ligate the afferent venous stem and remove the diseased portion of the vein in such cases also, although the danger from pyemia and pulmonary embolism is not so great in the extremities as in the region of the lateral sinus. Müller has put this theory to a practical test in a number of cases and obtained gratifying results. The dangers of pyemia and embolism were avoided, and healing of the local lesions resulted more promptly than when treated by rest, elevation, and local applications.

The same treatment is applicable for cases of benign thrombosis, such as occur in varicose veins of the legs, and give rise to so much distress. Here a preliminary ligation of the long saphenous vein, followed by an excision of its affected branches, meets a threefold requirement—the prevention of an extension of the thrombus with its consequences, the removal of the thrombus itself, and the relief or cure of the varicose condition. Treated in this way, thrombophlebitis is not a contraindication, as is generally considered, but actually constitutes an indication for the modern operations for varicose veins.

DISINFECTION OF THE HANDS.

In a brief review of the literature on disinfection of the hands, which, as now understood, means removing organisms from rather than hoping to kill organisms in the hands, CATHCART (*Scottish Medical and Surgical Journal*, April, 1902) remarks that it is a somewhat humiliating reflection that the enemies which the surgeon has most to dread to keep his wounds aseptic are just his own hands and those of his assistant.

It may be taken for granted, despite some assertions, that it is impossible to render the hands absolutely sterile. The organisms may lie so deeply in the crevices and cracks in the epithelium and in the interior of sweat and sebaceous glands that their complete dislodgment cannot be insured, while the attempt to destroy them *in situ* by powerful antiseptics injures the epithelium just as much, if not more, than it injures the organisms.

After careful experiments, Schaeffer has decided in favor of Ahfeld's hot-water-alcohol method as the best for reducing the danger of wound contamination with the hands. The hands are washed in a not over strong solution of green soap in water as hot as can be borne. All the scrubbing is to be done in the water that both hands may benefit by the soaking, which encourages perspiration and loosens epithelium. The water should be changed several times, and fine sand, powdered pumice stone, or marble dust may with advantage be used, as well as a nail-brush, which is imperative. This stage of the process should last ten minutes. The nails having been well cleaned all round with a nail-cleaner, the hands may be firmly rubbed with a dry sterile towel, although this last detail is not insisted upon. The hands are then to be scrubbed again in two separate quantities of spirit with a fresh nail-brush. This spirit scrubbing should take three and preferably five minutes. Finally the hands are to be bathed for a short time in a reliably sterile fluid to wash away any remaining organisms that have been loosened although not removed. For this purpose 1:1000 corrosive sublimate solution is recommended, not so much for its antiseptic effects as for its being a reliable sterile fluid.

Mikulicz's spirit-soap method ranks next, in the opinion of Schaeffer, to Ahlfeld's method.

Washing in a hand basin is preferable to washing in running water. Both hands can thus be completely immersed, and the hand basin is more convenient in general practice. Doubtful hand basins can be rendered safe by thorough cleansing before use.

Nail-brushes should always be sterilized,

and separate ones used for the water and for spirit scrubbings. The fine sand or pumice stone can easily be boiled and then kept dry, or soaking in an antiseptic fluid.

The advantages of gloves during an operation are counterbalanced by their disadvantages in prolonging the operation, in increasing the risks of some slip in the manual work, and in exposing the tissues to greater risk of bruising, in addition to special risks from rubber gloves. As a rule, rubber gloves are a perfect protection so long as they remain intact, but they are likely to be torn when passing needles. They encourage, also, sweating, the accumulation of which is dangerous at the close of a long operation. They are also most expensive.

Frequent rinsing of the hands during the course of the operation would probably serve the same purpose as changing thread gloves and take up less time; while one finger in each hand might be protected by a firm rubber finger-stall and made to bear the chief strain in drawing ligatures tight.

All the foregoing pertains only to healthy hands. Every authority on the subject is emphatic that no method of disinfection can pretend to protect a wound against an inflamed or suppurating hand. Slight cuts or grazes, if not inflamed, should be well covered up with collodion, or preferably with celloidin. This must be applied after the hands have been prepared. From the evidence the probability is that most surgeons have hitherto underestimated the danger of slight scratches on the hands, and especially on the fingers.

As to the preservation of the surfaces of the hand, powerful antiseptics roughen the surface and cause cracks. Even the hot-water-alcohol method damages the hands by removing the natural fat of the skin. It is therefore necessary to compensate for this by rubbing in some simple preparation of lanolin or oil at bedtime, and if possible also at the end of every operation. Haegler considers that such an act should be as regular a part of the daily habits as winding up a watch. The nails, of course, should be kept as short as possible. Nor should the hands be employed to take dressings from wounds; forceps are better. Thread gloves should be worn at ward visits. The hands should be protected with rubber gloves when opening abscesses and such like (where fine work is seldom required). Even at the end of an aseptic operation it is of great importance to wash the hands so as to get rid of culture material. The hands should be rinsed frequently during an operation, and the wound should be touched with them as little as possible, instruments being used instead.

NON-MALIGNANT GASTRIC ULCER.

Operation for non-malignant gastric ulcer, according to BARKER *(British Medical Journal,* Feb. 8, 1902), is only a desperate last resource, where perforation or hemorrhage is surely killing the patient. There is recovery, however, from operations for the other non-malignant conditions as a rule, if done before the patient is quite worn out.

It is impossible to say, in any case of gastric ulcer, whether some of the severe complications will not arise, and when they may be dangerous. Some of the most terrible, such as hemorrhage, come suddenly without any warning; others, such as cicatricial contractions, are preceded by a long train of troublesome symptoms. These facts may cause one to reflect whether surgical treatment ought not to be employed in a far larger proportion of cases, where proper medical measures are not leading to a cure, than is at present the case.

All the operations that Barker has done for non-malignant disease, without perforation, have been successful. The relief was marvelous, often after years of suffering and inability to follow a vocation. One of the recent cases, a man of forty-four, an invalid for a long time and a great sufferer, was enabled, after a posterior gastrojejunostomy, to return to his hard work after only a fortnight in bed.

Reviews.

THE PRACTITIONER'S MANUAL. By Charles Warrenne Allen. Second Edition, Revised and Enlarged.

New York: William Wood & Co., 1902.

It is not very long since we called attention to the first edition of this book, which in its present issue is very considerably increased in size. It is now a volume of nearly 900 pages, large octavo, and contains illustrations and tables which are designed to aid in diagnosis, although these aids

are by no means numerous. The chief object of the book is to present to the practitioner formulæ which have been employed by well known physicians in this country and abroad in the treatment of various diseases. These diseases are named in alphabetical order, and then follows a few paragraphs of text which in turn are followed by the formulæ which we have named. The fact that the first edition of this book has met with professional favor illustrates very clearly that a very considerable number of the profession prefer to copy the prescriptions of others rather than to originate them for themselves. There is some justification for this on the part of young practitioners who have not had sufficient experience to make them confident in writing prescriptions, and it may also be said that suggestions can often be obtained in this way which are of use in practical prescribing even by older physicians. On the other hand, the physician who depends upon the use of printed formulæ is not resorting to what might be called "rational therapeutics," and at the present time there can be no doubt that many of the profession are making the serious mistake of relying upon ready-made formulæ. Much, therefore, can be said for and against the principle upon which this book is compiled, for it does not profess to be original in any degree. The metric system is used interchangeably with the apothecaries' system, and where it is employed the equivalent in apothecaries' weights and measures is not given. The book is exceedingly well printed, with sufficient spacing, and good quality of paper, and to those who want an exhaustive work dealing with this subject in this manner it can be highly commended.

A Photographic Atlas of Diseases of the Skin. By George Henry Fox, A.M., M.D. Parts X and XI.

Philadelphia and London: The J. B. Lippincott Company, 1901.

We have already reviewed with terms of high praise the earlier parts of this beautifully printed and handsomely illustrated standard work. The tenth part deals with the inflammations of the skin produced by drugs, with psoriasis, with papular forms of lichen, and with keratosis. The illustrations are excellent and are as nearly lifelike as it is possible to pictorially reproduce eruptions or skin lesions.

Genito-Urinary Diseases and Syphilis. By Henry H. Morton, M.D. Illustrated with Halftones and Colored Plates.

Philadelphia: F. A. Davis Co., 1902.

This book presents the subject of genito-urinary diseases and syphilis in a condensed and, in the main, very satisfactory form. The whole subject is covered in less than 375 pages. The arrangement is almost that of the quiz-compends, and the headings and subheadings are in large type, making it easy for the student to find what he wants. It will, of course, be found that those detailed instructions and minute descriptions often necessary to the practitioner for the full understanding of the management of diseases are wanting. The teachings, however, are sound and modern, and the book will prove an interesting addition to the student's literature on the subject.

Practical Dietetics: With Special Reference to Diet in Disease. By W. Gilman Thompson, M.D. Second Edition, Enlarged and Revised.

New York: D. Appleton & Co., 1902.

It cannot be gainsaid that this volume of Dr. Thompson's is the best practical work on Dietetics which is before the English-speaking medical profession. The fact that it is as large as an ordinary work upon the practice of medicine or therapeutics shows how important the subject of dietetics has become, and the work is of value if for no other reason than that it impresses upon us the necessity of a more careful study of the influence of food in health and disease. We do not suppose that many busy practitioners will attempt to completely master all the facts which have been brought together in this volume by Dr. Thompson, but we do hope that many of them will turn from time to time to its pages in order to determine the best diet and mode of feeding for the various cases of disease which may come under their care. The first part of the book deals with food and food preparations; the second part with stimulants, beverages, and condiments; the third with food preparation and preservation, and the quantity of food required by the individual; the fourth with foods required for special conditions; the fifth deals with food digestion and conditions which especially affect this process. The remaining parts of the book are taken up with such important considerations as the general relation of food to

special diseases; the administration of food to the sick; the diet in infectious and respiratory affections; in diseases of the circulation and blood; the urinary system; the alimentary tract and associated organs; the nerves; the skin; and finally the consideration of diet for surgical patients, and the consideration of rations such as are employed in the various "cures" and in the armies of the great powers. The book is illustrated wherever illustrations are necessary, and is a most creditable production.

QUAIN'S DICTIONARY OF MEDICINE. Third Edition, Largely Rewritten and Revised. Illustrated. Edited by H. Montague Murray, M.D., F.R.C.P., assisted by John Harold, M.B., and W. Cecil Bosanquet, M.A., M.D.

New York: D. Appleton & Co., 1902.

Quain's Dictionary of Medicine is a book which was very familiar to all practitioners and students of fifteen or twenty years ago. It is probably less well known to the more recent graduate. Under the direction of Dr. Quain this encyclopedic, but single volume treatise, attempting to cover the whole realm of medicine met with extraordinary success, and speedily attained considerable popularity in this country and England. The publishers have called to their aid in the preparation of this edition an editor who has had large experience in teaching, and who is competent from other points of view to bring the book up to modern times, and who in turn has chosen as his assistants younger men who are also able physicians.

It is manifestly impossible for us to review thoroughly a volume which covers nearly 1900 pages. We can only look at some of the articles which are of importance and in which great advances have been made during the last few years. Among the first of these that come to our notice is that on sunstroke, which does not seem to us to represent modern views concerning this interesting condition. Under the synonyms of sunstroke "thermic fever" is not mentioned, although this term is continually used in the text when speaking of this condition, and this is regrettable since we believe that "thermic fever" is one of the most satisfactory terms which can be applied to describe it. Then, too, we miss with regret any mention of the modern view that sunstroke is largely a toxemia or depends upon infection. While it is doubtful if sunstroke or thermic fever depends upon any particular microörganism, there are many who believe that the condition which produces these symptoms renders the patient peculiarly susceptible to some infection which is directly responsible for the manifestations. Then, too, we find in the treatment which is recommended for thermic fever that bleeding is not mentioned. On the contrary, it is stated that it has now happily been almost abandoned. This is certainly in conflict with the experience of most American practitioners, and the best views recently expressed are that bleeding associated with hypodermoclysis is a life-saving measure which cannot be disregarded without serious results. Personally we are firmly convinced that it is as necessary to bleed the average case of sunstroke of plethoric type as it is to apply cold. We make these criticisms notwithstanding the fact that so eminent a writer as Sir Joseph Fayrer was the original author of this article, and that Dr. Kenneth McLeod has revised it.

So, too, in the article on typhoid fever. It certainly is not the experience of American practitioners, nor do the statistics of the world in general show that the bowels are usually loose in typhoid fever. On the contrary, the most competent statistics which have been recently published show that constipation is quite as common as diarrhea. And in the article upon the sequelæ of typhoid fever we find nothing said of the interesting investigations which have been made as to the infection of the gall-bladder and liver by the microörganism of this disease. We do not agree with the author in stating that typhoid fever with constipation is "a difficult form of the disease to treat," or that it constitutes "a distinct variety of the disease." There are other criticisms in regard to the article on typhoid fever which might be named, but one's feeling after reading it is that it is incomplete and not entirely correct, particularly as in the discussion of the use of cold, and the cold bath, nothing is said in regard to the necessity of producing a reaction and using active friction.

Under the article on "Diseases of the Gall-bladder and Cholangitis" we are sorry to see that nothing is said in regard to the frequency with which typhoid fever is responsible for these lesions, nor is anything said about the bacillus of Eberth as a

nidus for the formation of gall-stones. Still more remarkable is the fact that under the use of cold as an anesthetic nothing is said about the employment of ethyl or methyl chloride for this purpose, but on the contrary it is stated that cold as an anesthetic has been almost superseded by cocaine, and ether is recommended as the evaporating agent to produce cold.

In the article on Anesthetics nothing is said about the advantages of administering oxygen simultaneously, nor of the use of nitrous oxide to institute the anesthesia, and the following of it by ether or chloroform.

In other instances, however, as in the chapter upon the Blood and that upon Malarial Fever, useful plates have been introduced in addition to the text, and the material has been brought up to the times in a complete manner. The article on Pain in Visceral Diseases by Dr. Head is an exceedingly able one and embodies in some detail original investigations into this important subject, being illustrated by plates which still further elucidate his studies.

We have picked out of a mass of exceedingly valuable material a number of points deserving of criticism, but we would not have it thought that in doing so we wish to condemn the book. It is an admirable work.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Articles. Edited by Henry W. Cattell, A.M., M.D., with Collaborators. Volume I, Twelfth Series, 1902.

Philadelphia: The J. B. Lippincott Company.

The present volume opens with a biographical sketch of Dr. S. Weir Mitchell, of Philadelphia, and Dr. John A. Wyeth, of New York. Both of these are illustrated, one showing Dr. Mitchell at the Orthopedic Hospital and the other Dr. Wyeth in his private office and in the clinic of the New York Polyclinic. After these biographical articles there are seven upon various phases of therapeutics—one upon the use of opium in daily practice by Arthur V. Meigs, the report of a clinic delivered by this physician at the Pennsylvania Hospital. Horatio C. Wood, Jr., also concludes his description of methods of investigating the action of drugs, and Dr. Hinsdale writes an article upon the climate of New England. At the close of these articles there are a few pages devoted to what are known as "practical hints," which consist in excerpts from seven articles which have appeared in various medical journals. The remaining portion of the volume is given over to medicine, surgery, obstetrics, otology, and finally a review of the practice of medicine during the year, including all branches of medicine, which the author, Dr. Watson, has endeavored to put in 102 pages. Amongst the articles in medicine which seem to us of particular interest is one by Dr. Hemmeter upon gastrointestinal autointoxication, while another in the department of obstetrics on the "contest of the advocates of symphyseotomy and the partisans of Cæsarian section" is also of value. A considerable number of illustrations are also included.

CHILDBED NURSING AND INFANT FEEDING. By Charles Jewett, A.M., M.D. Fifth Edition. New York: E. B. Treat & Co., 1902.

This is a little manual designed for the Training School for Nurses of the Long Island College Hospital, and subsequently enlarged and rewritten, so that it would be more suitable for general use. It is too complete in its details to be given to the laity, but is a valuable book for nurses, and from its pages physicians can obtain many excellent suggestions in regard to the various details of obstetric nursing and infant feeding. To deal with such a subject in a satisfactory way for readers other than physicians is always a difficult task, but Dr. Jewett has succeeded admirably in his endeavor.

OPERATIONS OF SURGERY. By W. H. A. Jacobson, M.Ch. Oxon., F.R.C.S., and F. J. Steward, M.S. London, F.R.C.S. Fourth Edition; 550 Illustrations. Two Volumes.

Philadelphia: P. Blakiston's Son & Co., 1902.

Since the first edition of Jacobson's work in 1888 it has been recognized as the standard upon the subject of operative surgery. His last revision, incorporating, as it does, to a remarkable extent the progress of the last few years, is likely to be received with even greater favor than its predecessors. For the student or the practitioner in surgery, the work is a truly admirable one. The classification is a purely practical one, and begins with a brief outline of the practical anatomical points on which operations are to be performed.

The first chapter, devoted to operations

on the hand, includes the various amputations, tendon suture, tendon lengthening and shortening, and tendon grafting. The section devoted to the upper extremity is subdivided into operations on the hand, wrist, forearm, the neighborhood of the elbow-joint, arm, axilla and shoulder, removal of the scapula, a full description of the interscapulothoracic amputation, and removal of the clavicle. Skin-grafting by Thiersch's method is described in detail.

The section devoted to operations on the head and neck includes all that is modern and serviceable in plastic surgery of the soft parts, osteoplastic work, cerebral localization, and surgical intervention for the relief of diseased conditions of the cranial contents. Gigli's saw, Horsley's bone-cutting forceps, and De Vilbiss's craniotomy forceps are figured and described in detail. The various methods of dealing with the Gasserian ganglion are fully described.

In dealing with the various methods of closing a complete cleft of the hard palate, the most modern and perhaps most successful method, at least in its applicability to children, is not mentioned.

The resection of the cervical sympathetic is advised as applicable to the treatment of glaucoma. The technique is given in detail.

The modern complete operation for the removal of the breast is fully described, and mention is made of suture of the heart and the treatment of wounds of that organ. The subject of hernia receives full consideration. The various methods of intestinal anastomosis are noted.

Although Jacobson modestly asserts that this book is intended to serve those who have recently been selected for hospital appointments, or those who are working for a higher examination, it will be found most useful to the active, experienced surgeon. Indeed, it is impossible to praise the work too highly.

MANUAL OF SURGICAL TREATMENT. Volume VI. Treatment of the Surgical Affections of the Tongue and Floor of the Mouth, the Pharynx, Neck, Esophagus, Stomach, and Intestines. By W. Watson Cheyne, M.B., F.R.C.S., F.R.S., and F. F. Burghard, M.D. and M.S. (Lond.), F.R.C.S.

Philadelphia and New York: Lea Bros. & Co., 1902.

It will be remembered by those who are familiar with the previous volumes of this praiseworthy and in many respects admirable work that the authors have endeavored to put themselves in the place of those who have to treat a case for the first time, and that they have attempted to supply all the details as to treatment from the beginning to the ending of the illness. They assume that the reader is familiar with the nature and diagnosis of the disease, and they refer to pathology and symptoms only when it is necessary to render intelligible the principles on which the treatment is based. The treatment described by the authors is the one shown to be best by experience.

The section devoted to the tongue has included in it a very complete chapter upon operative procedures.

The authors, in the part given over to treatment of abdominal affections, call attention to the advisability, when this is practicable, of making a celiotomy by splitting the muscular fibers rather than cutting through them. They advise, in place of a median incision, that the cut should be carried at least one inch to one side of the middle line, so that the fibers of the rectus may be separated instead of the fibrous interval between the recti.

In diagnosing diseases of the stomach, directions are given for test-meals, for inflation, and for washing out this organ. Witzel's operation is the one preferred when gastrostomy is required, and the details are given in full. Franck's method is also described.

Gastric ulcer, it is stated, should be subject to operation, when the symptoms are long-continued and do not yield readily to medical treatment—particularly when profound anemia has resulted from the repeated hemorrhages, when it is necessary to arrest profuse hemorrhage which threatens life, when there is obstructing constriction due to cicatricial contraction, when there is perforation into the peritoneal cavity, when distressing and harassing symptoms due to adhesion occur, or when a subphrenic abscess develops.

It is noteworthy that the authors are more conservative in their advice concerning operation for appendicitis than is customary among American physicians.

In the section devoted to hernia the authors state their opinions that in children over six years of age a radical cure should be performed without any attempt to cure the hernia by the application of a truss. Similar advice is given in regard to young

adults. Kocher's, Macewen's, Bassini's, and Halstead's methods are described in detail.

DIAGNOSIS OF SURGICAL DISEASES. By Dr. E. Albert, Vienna. Translated from the Eighth Edition by Robert T. Frank, A.M., M.D. Fifty-three Illustrations.

New York: D. Appleton & Co., 1902.

This work is intended for the clinician. It groups surgical diseases in accordance with similarity of symptoms and points of general resemblance. There is thus presented to the student a classification which, though not technically scientific, is likely to be more serviceable to him than if it were based solely on pathological findings.

The first chapter is devoted to the causes of abnormal positions of the head. After a discussion of the dynamics of the head motions, traumatisms are considered, and, thereafter, torticollis. Then follows a chapter devoted to injuries of the brain and their primary sequelæ. Attention is called to the difficulty of determining by palpation the distinction between hematoma and a depressed fracture. Tumors of the skull are very briefly considered, whilst a complete chapter is devoted to trigeminal neuralgia. Under the head of diseases of the maxillæ, conchiolinostitis is mentioned. This is an affection attacking workers in mother-of-pearl, and is characterized by enormous thickening of bone of the lower jaw; this gradually disappears in the course of a few weeks. Attention is called to the fact that retromaxillary tumors may be mistaken for enlargement of the parotid gland. Under the title of Dysphagia are discussed the various causes of stenosis of the esophagus. Included under this head are found such conditions as primary dilatation and esophageal diverticula. No reference is found, under the chapter devoted to stenosis of the air-passages, to the so-called thymus shock. Injuries of the shoulder apparently include only fracture and luxation, no space being devoted to those contusing lesions which, in their ultimate effect, are often more crippling than fracture. Diseases of the extremities are classed under dislocation, fractures, and inflammatory processes, those best known and well recognized being briefly discussed. The diagnosis of abdominal tumors is very briefly considered. There is a chapter devoted to disturbances of micturition, one to conditions met with in various diseases of the bladder, and a few pages to diseases of the rectum.

Though this work evidently represents the result of an enormous personal experience, references being made to illustrative cases throughout the text, it is far from complete or satisfactory. It is, in some places, so elementary as to be of service to the student only; in others it represents the results of experience such as few men have had the opportunity of acquiring.

SURGERY OF THE RECTUM. By Charles B. Kelsey, A.M., M.D. Sixth Edition; 215 Illustrations.

New York: William Wood & Co., 1902.

This is a new book by Kelsey, and not another edition of a work with which the profession is so familiar, since he states that, in his desire to condense as far as possible and to produce a concise treatise adapted to the wants of those who wish to treat intelligently all rectal affections, he has entirely rewritten the book.

The first chapter is devoted to diagnosis and examination, and includes a description of the various instruments employed. The second chapter is devoted to general rules regarding operations. Immediately after follows a chapter devoted to congenital malformations.

Kelsey gives a very complete picture of ulceration of the rectum, and states that many cases of fissure can be cured by local applications.

For the relief of stricture of the rectum he proposes intestinal anastomosis around the stricture.

Rectal and perirectal abscesses and fistulas are considered at length. In the treatment of hemorrhoids, the first surgical measure to be considered is the ligature. This Kelsey used for many years, but in selected cases he now employs injections; the solution of choice is carbolic acid in pure water, with sufficient glycerin added to make a perfectly clear, colorless mixture.

Prolapse of the rectum, intussusception, the formation and closure of artificial anus, intestinal resection and anastomosis, tumors of the rectum and anus, and cancer, are discussed with admirable brevity and clearness.

Pruritus is honored by the customary prescriptions.

There is a final chapter upon affections of the genito-urinary organs involving the rectum.

This work is conservative and character-

ized by wisdom and sound common sense, associated with the judgment which comes with an enormous experience.

Correspondence.

LONDON LETTER.

By Raymond Crawfurd, M.A. Oxon., M.D., F.R.C.P. Lond.

Most of the medical societies have now put up the shutters till the winter session, but the past month in this direction has been one of exceptional activity and interest. Godlee's paper to the Royal Medical and Chirurgical Society was full of points of practical therapeutic importance. Perihepatitis is an almost invariable accompaniment of tropical abscess, and affords an element of safety in that it helps to localize the abscess. If there be no adhesions the introduction of an exploring trocar into the liver will probably be followed by the escape of pus into the peritoneal cavity. The peritoneal cavity in the neighborhood of the puncture should then be carefully sponged before proceeding to further exploration of the liver. The safest plan is to pack round the part where the incision is to be made before the abscess is actually opened, and after the opening has been made to manipulate the parts as gently as possible. The peritonitis most commonly affects the upper surface of the liver, leading to the adhesion in whole or in part of this surface of the liver to the diaphragm. Thus downward displacement of the liver is prevented, and a very large abscess may only be indicated by partial dulness in the lower part of the chest. Perihepatic peritonitis may also occur on the under surface of the liver; then the stomach, duodenum, and colon may become firmly adherent to the liver, and after the abscess has been evacuated, the displacement of these viscera from contraction may lead to very serious results. If the transverse fissure and the small omentum have been the seat of the peritonitis, any or all of the hepatic ducts may be partially or completely obstructed, and the whole of the bile may escape from the wound.

Pleurisy, owing to the direction of lymphatic flow, is another very common complication. Rupture into the pleura is one of the most dangerous results of an abscess; pleural effusion is usually immediate and copious, and may induce such a collapse of the lung as may not yield to the most extensive Estlander operation. Happy is the man in this case who has abundant pleural adhesions. Inasmuch as it would often save trouble and anxiety if the presence or absence of such adhesions could be determined, Godlee put forward two suggestions in diagnosis: (1) The upper level of the dulness caused by a liver which is enlarged upwards is, speaking generally, considerably lowered when the patient is placed on his left side. If, however, the lower part of the pleural sac is obliterated by adhesions this does not occur, because the lung cannot be sucked down into the pleural sinus by the falling away of the liver—that falling away which so frequently causes pain when the patient attempts to lie on the left side. (2) In very thin people, even when the parts are normal, it is often possible on careful inspection to see the lower margin of the lung on the right side move upward and downward on respiration. It may sometimes be observed on the left side, especially if the pleura be enlarged, or there be a great enlargement of the left lobe of the liver, or indeed any tumor in this situation; and on the right side it is more obvious when the liver is enlarged than when it is of normal size. If this sign be present, it is a certain proof that there are no adhesions in this situation, and that there is little or no pleural effusion.

In connection with the question of adhesions, Godlee makes a practical suggestion. If the incision for opening the abscess has necessarily to pass through the pleura below the lower border of the lung, it is often difficult or impossible to tell whether the cavity is obliterated by lymph or not. Godlee admits that more than once he has cut through both layers of the pleura, and as no air entered, gone on to incise the diaphragm and liver, and only discovered it by the inrush of air on withdrawing the finger. The right way to proceed, in cases of doubt, is to cut through the diaphragm across its fibers at the part nearest its costal attachment, and to sew up a flap of the muscle to the intercostal muscles at the opposite end of the wound. The incision into the abscess can then be undertaken without fear of producing pneumothorax.

Pleural friction is an ominous sign, as a

precursor of rupture into the lung, so that when there is marked pleural friction, exploration of the liver should be made without delay. In every case in which an abscess bursts into the lung a certain amount of lung tissue must be destroyed, and an abscess formed. Pulmonary abscess consequent on hepatic abscess should be opened without delay, and a careful search should be made for outlying suppurating tracks: these should be drained by the insertion of full-sized tubes, and as far as possible laid freely open, even if this should necessitate extensive removal of ribs; and the tubes should not be removed or shortened until closure of the abscess is almost complete. With regard to the question of the best place to make the incision for evacuation of the abscess, Godlee lays down that the seat of election is in the lower axilla. If two lines be drawn vertically downward, prolonging the anterior and posterior folds of the axilla as far as the margin of the ribs, they will, at the lower part, enclose the space where the widest interval intervenes between the lowest part of the pleura and the costal margin, an interval generally of two inches, and often even greater. The incision may conveniently be made transversely—*i. e.*, parallel with the lower margin of the pleura—removing the portion of one rib and cartilage that crosses the wound obliquely, great care being taken not to wound the pleura, should it extend lower than usual. In such a case the pleura may easily be directed up without harm, and fastened to the upper part of the wound; if accidentally injured, it should be sutured and made perfectly air-tight before proceeding. The diaphragm is then incised, preferably in the direction of its fibers, and the diaphragmatic peritoneum cut through. If there be no adhesions the liver may either be sutured to the diaphragm or chest walls, or the parts around the opening may be carefully plugged with some antiseptic material. In the latter case it must be borne in mind that if the abscess is large, the liver will immediately shift its position in an upward direction.

The lateral route is available for abscesses in nearly any position, and is far preferable to a posterior incision, which necessarily involves a transpleural operation. An epigastric incision drains badly, and should be avoided if the pus can be reached from the side. In some cases an epigastric opening may be a desirable adjunct to a lateral operation. A lateral incision below the costal margin is strongly to be deprecated, because the opening is certain to become troublesomely oblique in the course of a few days as the liver shrinks up under the ribs. The opening into the liver itself may conveniently be made with a long pair of dressing forceps followed by the finger. In this way abscesses at a great distance from the surface may be safely reached and effectually drained. Free hemorrhage is frequent, but it usually stops spontaneously if the finger be retained for a minute or two in the wound. Should it not do so, the tube must be carefully packed round. Copious recurrent hemorrhage is more characteristic of acute septic cases than the more chronic simple amebic abscesses. Godlee considers that Manson's operation of introducing a drainage-tube through a large trocar boldly through all the superficial tissues into the abscess might be the best available method where skilled surgical attention cannot be had, but it takes no account of the condition of the pleura or peritoneum, of the possible ramifications of the abscess, or the success of drainage. Some of the speakers in the discussion claimed to have got as uniformly good results with aspiration as with incision, and considered that in this way the dangers of hemorrhage were avoided. Probably this is the case with the abscesses of comparatively benign type, but there can be no doubt that in severely septic cases free incision is the only justifiable procedure.

At the Edinburgh Obstetrical Society Dr. Oliphant Nicholson read some notes on the use of thyroid extract in puerperal eclampsia and the preëclamptic state. The first case was a primipara at the beginning of the eighth month. She was sent to bed and put on milk. After the first fit she was given one-third of a grain of sulphate of morphine subcutaneously. A second fit soon followed, and when the stupor had passed she was given ten grains of thyroid extract, and five grains every successive four hours. After this there was only one slight fit, and in a few days she was delivered prematurely of a still-born fetus. Another case in the seventh month complained of headache and dimness of vision, and had firm, solid edema, a pulse-rate of 50, a greatly contracted artery, and great diminution of the

quantity of urine. She was sent to bed and put on milk for ten days, with only slight improvement. She was then put on five grains of thyroid extract thrice daily, with marked improvement in six days. The dose was then increased to five grains every three hours for seventeen days, then stopped for a fortnight, and begun again with five grains daily. The symptoms gradually disappeared, and she was delivered normally of a still-born fetus. A third well marked case was given five-grain doses every four hours, and advised to rest in bed as much as possible, and to live mainly on milk and fish. In fourteen days the patient was practically well, and the profuse albuminuria had disappeared.

At the Harveian Society Watson Cheyne showed a boy who had lost the bridge of his nose from syphilitic necrosis of the nasal bones. The bridge was restored by the injection of paraffin, an ordinary serum syringe being used and introduced right down to the remains of the nasal bones. The first injection was made with paraffin melting at 120° F., and the second at 104° F. after a week's interval. The great point is to have the hot liquid near the patient's face, so that there is no time for it to cool. The point of the nose which had been held down during the operation remained depressed afterwards. No inflammatory action was excited. The objection to these operations, particularly with paraffin at 120°, is its liability to run into the space between the eyes and the eyelids.

Dr. Rayner's paper at the Medico-Psychological Association of Great Britain and Ireland, on "Sleep in Relation to Narcotics in the Treatment of Mental Diseases," had the effect of producing a very interesting discussion. Rayner considers that a good deal of mental and nervous disease is due to abuse of these drugs. He held that as in sleep the general physiological state is one of increased rather than decreased nutritional activity, in the narcotic state secretion, excretion, and nutritional repair are greatly interfered with. In insomnia the condition is one of defective nutrition of the brain cells, and for this reason it is difficult to see what benefit can be derived from narcotics. He considers that the occasions of usefulness are very few, and that there are many methods by which their use might be obviated. Rayner's views were severely handled by most of the alienists who joined in the discussion. Blandford agreed with Rayner as concerns excessive doses of narcotics, but considered that in appropriate doses the effects are indistinguishable from those of sleep. He is convinced that among the general body of the profession far too large doses of sedatives are given, and that they are continued for too long a time. Savage held that it is impossible to avoid narcotics, though many other methods of relieving insomnia might meet with success in appropriate cases: for example, hydrotherapy in those already loaded with toxic agents, the gouty and the alcoholic; in such cases a dose of calomel followed by saline waters and baths is of great value. It is a working axiom with him that in painful conditions opiates and narcotics assist in procuring sleep, especially in cases with mental pain. He considered that in many cases narcotics are of the greatest benefit in warding off threatened attacks of insanity. Fletcher Beach spoke highly of sulphonal in cases of neurasthenia, and has never found it to provoke indigestion or emaciation. Bollon considered the prolonged use of sulphonal most pernicious from the point of view of autointoxication. He has found ten cases of hematoporphyrinemia to every one of hematoporphyrinuria. He considers, however, that the drug is most valuable in early cases of insanity, but absolutely injurious, even in moderate doses, in ordinary acute insanity with extreme restlessness and sleeplessness.

In the Section of State Medicine at the Royal Academy of Medicine in Ireland, Professor McWeeney recorded some striking observations on the reaction of milch cows to the tuberculin test. In one herd kept under the most perfect hygienic conditions a reaction was obtained in fifty per cent, and in another herd under much less favorable conditions as high as ninety per cent. Consequently, if a reaction were taken as indicating that the milk was unfit for human consumption, the milk-supply would practically cease. He also found the vigor of the reaction inversely proportioned to the extent of the disease, as though the disease conferred partial immunity. Contrary to the dictum of Koch at the London Congress of Tuberculosis last summer, he considers that bovine tubercle is capable of infecting the human being.

PARIS LETTER.

By R. H. Turner, M.D. (Paris).

Dr. Baylac, physician of the hospitals at Toulouse, has had very good results in the treatment of tuberculous peritonitis by puncture and lavage with sterilized water. He reports ten cases, with six complete cures. The water employed is sterilized at a pressure of three atmospheres, and the puncture is made with the Potain trocar half-way between the umbilicus and the left superior iliac process. The patient should be placed on his left side, so as to cause the accumulation of the liquid in that region. When the ascitic fluid has been removed, three to four liters of water is injected, and then allowed to escape. This is repeated three to four times. The patient should remain perfectly quiet for several days after the operation.

At a recent meeting of the Society of Surgery, Dr. Lejars made a very interesting communication on a case of partial destruction of the femoral artery, where he tried to perform suture. The patient had been crushed between two tram-cars, and in the inguinal region there was a large infiltration of blood. The tibial artery had ceased to beat, the leg was paralyzed, and anesthesia could also be found. The femoral artery was discovered and tied temporarily. The tunicæ media and interna were ruptured. The clots were removed, the artery was catheterized, and Dr. Lejars then tied the artery with Lembert sutures. For the first few days there were some signs of improvement, but an embolus formed in the popliteal artery and amputation was found necessary.

At a meeting held by the Medical Society of the Paris Hospitals on May 30, Dr. Comby described the treatment he had carried out during the last eight years in 240 cases of chorea. Ninety cases did not require much treatment and were cured by rest, lacto-vegetarian diet, and the wet pack. The others were treated by antipyrin, 70 cases; arsenic, 54 cases; cacodyle, salophen, and chloral, 25 cases. The treatment by arsenic seems to be the most efficacious.

The Fourth International Congress of Gynecology and Obstetrics will take place in Rome from September 15 to 21. The treasurer of this congress is Prof. Felice La Torre, 8 Via Venti Settembre, Rome, and the cost of membership is 25 francs. Reports will be made on the following subjects: Medical indications of premature delivery; hysterectomy as a treatment of puerperal infection; genital tuberculosis; surgical treatment of cancer of the uterus.

At a meeting held by the Academy of Medicine May 20, Professor Landouzy described the treatment carried out by Dr. Barbary, of Nice, in smallpox, and the excellent results he had obtained. The treatment employed was that of Finsen—that is to say, the use of red light and a vigorous application of the principles of asepsis and antisepsis. The body is washed wth a solution of corrosive sublimate, and the parts more specially affected are treated with a mixture of salicylate of soda, laurel water, and alcohol. The bowels are kept open by the use of enemata, and internally carbolic acid, salol, and hydrobromate of quinine are administered. Eight cases were treated in this manner, and recovered without having any scars on the face.

Professor Huchard, who recently started the discussion on the use of chloroform with cardiac patients, ended it by making a few remarks on the real cause of death from chloroform. It is only in ten per cent of the cases that the heart can be supposed to be the cause of death. Whenever accidents take place, it is often due to the inexperience of the physician who is producing narcosis. It is always well to give an injection of morphine and sparteine, and this renders chloroformization relatively innocuous.

Dr. Moure, of Bordeaux, a well known specialist in diseases of the throat, has found the following preparation beneficial in the treatment of granular pharyngitis:

> Iodine, 25 centigrammes;
> Iodide of potassium, 30 centigrammes;
> Wine of opium, 3 grammes;
> Pure glycerin, 120 grammes.

This should be applied to the throat once or twice a week, and a teaspoonful of this mixture in a half-glassful of water makes a very good gargle. Tincture of guaiac is also recommended by Dr. Moure. Another formula is:

> Borax, 6 grammes;
> Antipyrin, 4 grammes;
> Tincture of guaiac,
> Elix. aromatic, āā 5 grammes;
> Glycerin, 140 grammes.

A teaspoonful in a half-glass of water as a gargle.

These preparations should be used as a gargle only during the subacute stage, and pure when there is not much inflammation.